

AN
ESSAY
ON
THE NERVES,

ILLUSTRATING

THEIR EFFICIENT, FORMAL, MATERIAL, AND
FINAL CAUSES;

With a Copper-Plate,

DESCRIPTIVE

Of their Anatomy, and a Plate of Figures displaying the Manner of the Liquids being corrupted by corrosive Acids and stagnated by obtuse Alkalies.

TO WHICH IS ADDED

AN ESSAY

ON

FOREIGN TEAS;

IN WHICH

Their Nature, Preparation, Manner of Using, and Effects, are investigated, so as to demonstrate their pernicious Consequences on the Nerves, and, therefore, on the Health of the Human Body.

WITH OBSERVATIONS

On Mineral Waters, Coffee, Chocolate, &c. and the Author's Remarks arising from his Analysis of such Preparations as may be most beneficially substituted for INDIA TEA.

THE WHOLE

Being designed to enable all Persons in Health or Disease, to instruct Themselves in the first Principles of knowing systematically the Construction of their Bodies, with the Causes and Cures of most Disorders incident to Nervous Affections.

INTERSPERSED

With select Illustrations from the most scientific and respectable Authorities in the Theory and Practice of Physic.

B Y
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P R E F A C E

TO THE

ESSAY ON THE NERVES.

HAVING published several chymical and medical treatises that have been honoured with the favourable opinion of the Public, I have been induced to resume my pen on a subject which is of the most interesting nature to the community at large. There being no matter on which the happiness of mankind more depends than on the uninterrupted enjoyment of health, to enquire into what is that system which either preserves or destroys the constitution, suggested itself as that which must claim the most general attention. Enquiries may be made into theories and practices, but none can be so immediately requisite, or so likely to prove useful, as that which relates to the first causes of health and disease. Having examined every hypothesis relating to physic and the constitution of man, none appears so essentially deserving notice as the system of the nerves. From every investigation, I am convinced they possess the first principles of preserving health or

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incurring disease. In order, therefore, to trace in what manner the seeds of health or sickness first produce their beneficial or injurious effects from the nerves, the following pages are impartially devoted. In this enquiry, the errors of former theorists are displayed, the real nature of the nerves ascertained, their uses developed, and their diseases described. So that, from this brief investigation, the reader will be able to trace the source of his own health or disorder, and be enabled to apply the most effectual means of preserving or restoring his constitution.

AN ENQUIRY
INTO
THE NERVOUS SYSTEM.

CHAP. I.

THE EXISTENCE AND NATURE OF THE ANIMAL
SPIRITS.

TO convey a clear idea of the nerves, it is necessary to enquire into their final cause. From this will be ascertained their nature, principle of operation, and by what they may be injured or preserved. This knowledge obtained, will direct us in the discovery of what are nervous complaints, their origin, and their remedies.

The many that have written upon this subject have chiefly disputed on their principle of moving the muscles of the human frame by mechanical contraction and dilatation, denying their being tubular, and, thus, disputing the possibility of their being the canals of animal spirits. Others, on the contrary, have contended that they were not solid fibres, but were tubes which conveyed the animal spirits into the muscles, and thus dilated or contracted them. Each of these seemed to have attained a part, and not the whole truth of the nervous principle. From this error, those who denied the nerves being the canals of the animal spirits, led to the mistake of disbelieving that vital power on

which, not only the health,—and disease,—but even the existence of human nature immediately depends. And those who have contended that the nerves were the vehicles of the animal spirits, which served to dilate or contract the muscles, destroyed that mechanical energy of the nerves themselves, from whence all muscular motion originates. That the nerves possess alone the power of moving the muscles has been demonstrated by several experiments that have been made by Galvani, Eusebius Valli, and others, on animal electricity.† From the many ingenious trials that the latter made upon several frogs, he constantly observed that when there remained the least irritability in their limbs, he found they were capable of being moved in proportion to the communication made between the coating and the nerve. From this he not only justly concluded that the nerves had the power of affording muscular motion—but that it also continued longer in their extremities than in their origin.

From ligatures upon the brachial plexus and tying the phrenic nerve of several animals, he found, from electrifying them in this state, that when the nerves are tied, the electrical fluid, meeting with a better conductor, leaves its usual course. But, that it always follows the channels of the nerves when it has no other course to take. When the electric fluid is weakened, either it is inactive or else has not sufficient energy to irritate the muscular fibre.* These are adduced as incontestible evidences of the nerves moving the muscles, and their debility being chiefly caused by the electric fluid being, by some means, weakened or exhausted.

Having, thus, stated in what the advocates for each system appear to have erred, the following arguments will be offered to shew that the nerves are the canals of the animal spirits, and that they dilate or contract

the

† See Eusebius Valli's Experiments on Animal Electricity, p. 37.

* Valli's Animal Electricity, p. 59.

the muscles of the human frame by their own positive energy, and not by the medium of pouring or withholding the animal spirits.

The nerves being here asserted to be the conveyance of animal spirits, throughout the human system, it may be proper to define what is understood by this extraordinary liquid.

The animal spirits are defined to be a very thin liquid, distilled from the blood in the outward and cortical substance of the brain. From thence it is conveyed through the medullar substance of the brain, the corpus callosum and medula oblongata, to the nerves, and from thence to the muscles and every other part of the human frame. By the elasticity and rarity of this universal fluid, all the liquids of the body are kept in one motion. This liquor being so subtile, as not to be perceptible to sight, has caused some anatomists to consider it a wind. But as wind is nothing but air in motion, and air being capable of condensation, so as to change from a dry into a moist fluid, the animal spirits may be the latter species — but in the greatest degree of rarefaction in which it can retain its moisture. As it escapes the observation of sight even assisted by the best microscopes, it must be the most subtile of all moist fluids. From this extreme smallness of its particles, it seems intended to penetrate the minutest pores of the least fibres, as well as to fill the vessels of the largest muscles. Thus it may be said to fill and vivify every part of the human body. And as it appears that it is the universal pervading principle of all our frame, whatever disorders the canals by which it is conveyed, must proportionably disorder and debilitate the whole constitution. From thence it appears how essentially and immediately the first principles of health depend on the nerves being preserved in their natural vigour. Although Harvey has joined most of the European Physicians against the opinion of Glisson, Wharton, and

and Willis, and the College at Paris, who contended that the animal spirits were conveyed by a nervous fluid *a succus nutritius e sanguine suppeditatus*, supplied by the blood, yet the recent experiments in animal electricity of Galbani and Valli are greatly in favour of the motion and vitality of the animal spirits being dependent on such a principle. The extreme delicacy of the pulp of the nerves being well adapted to conduct this electric fluid, all the animal functions as well as the spirits may derive their powers from this medium. The greatest care should be therefore taken to avoid whatever may tend to diminish, embarrass, or counteract the efficiency of this energetic principle. That narcotics tend greatly to diminish the vigour of this vivifying fluid, the application of opium to the animals on which the experiments were made by these physicians, sufficiently demonstrates. Valli found that opium although it did not immediately destroy vitality, it in about five minutes deprived the nerve it enveloped of its faculty of conducting the electric fluid. And further, that it "almost constantly accelerated " the death of those parts on which it has been allowed to exert its influence for a longer time; as " for a quarter of an hour, twenty or thirty minutes." But for the absolute destruction of vitality in the limbs of the animals on which he operated, that half an hour and sometimes a longer time he found was required. The experiment that he made on a dog, previously killed by arsenic, deserves particular notice. As he could not perceive that the poison had weakened his electricity or vital power*, might not the animal functions have been only suspended? And might he not have been recovered by such means as are now so successfully used to restore animation? This appears a subject well worthy the consideration of physical professors. For it is very probable that many who seemingly die by convulsions might, by timely assistance,

* Animal Electricity, p. 86.

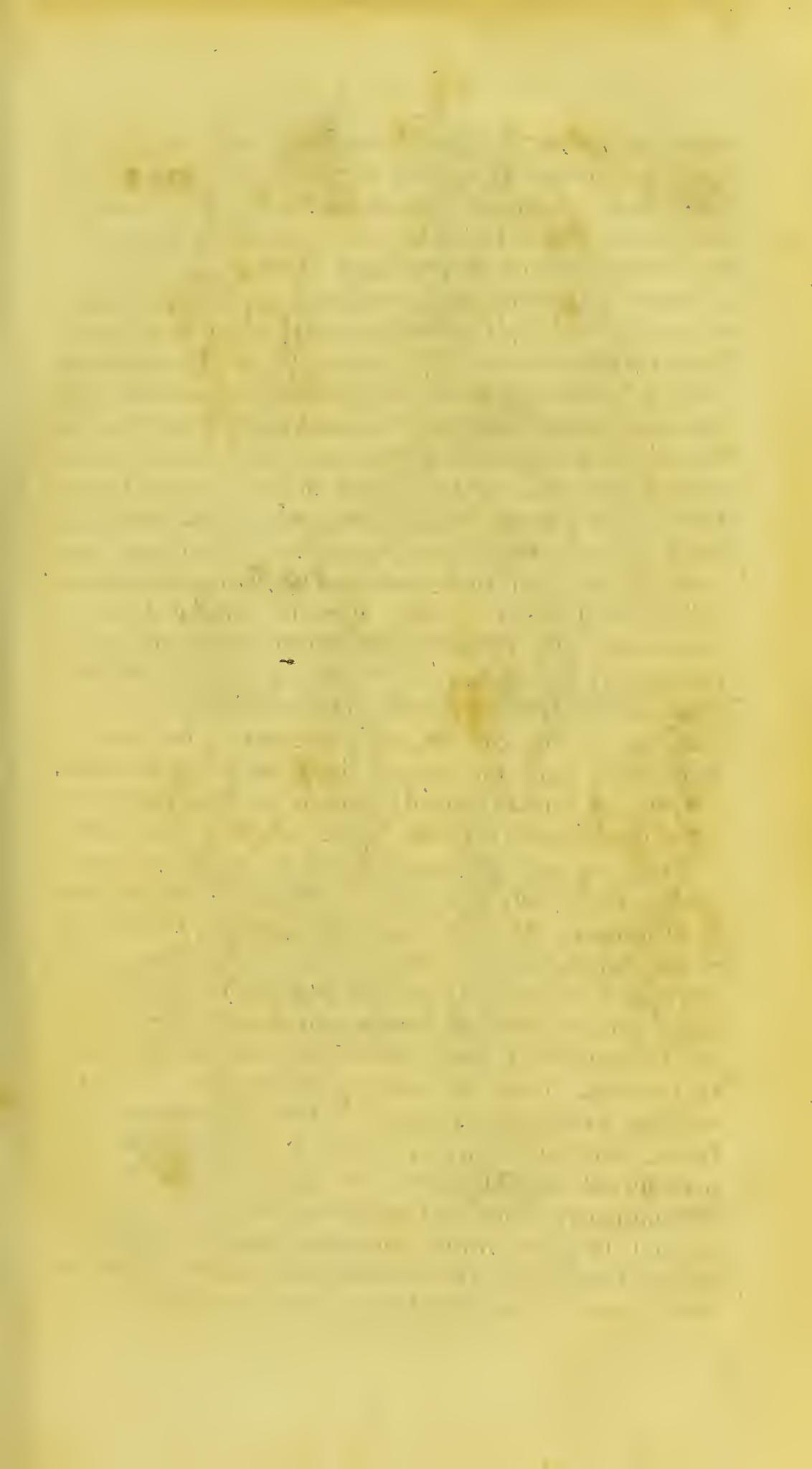
ance, be recovered. It is also necessary to notice that even arsenic is not found to destroy electricity or vital power, although they are both extinguished in the animal by opium. But with respect to the restoration of life in many cases where the animal is apparently dead, history affords many instances. And even the experiments of Doctor Valli himself upon some fowls which he plunged in water, until they were thought to have been entirely dead, and afterwards restoring them to life by electricity, proves the possibility of re-animation in many instances that are now too fatally neglected. Electricity may be found a great assistant in the practice of that laudable institution, the Humane Society. As the preservation of life is the chief design of this Essay, the above particulars are here most anxiously offered to the attention of those whose immediate concern it is to relieve and preserve human nature.

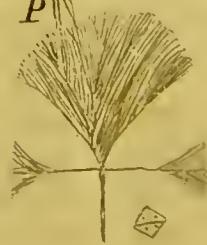
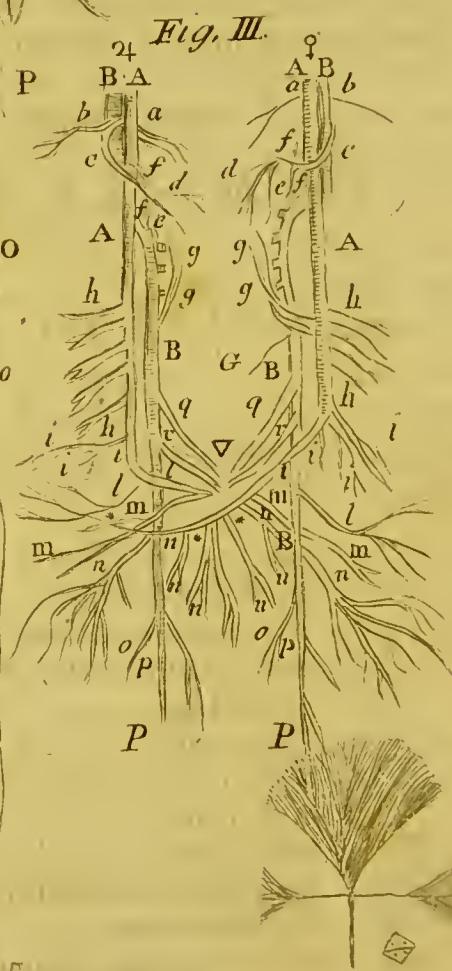
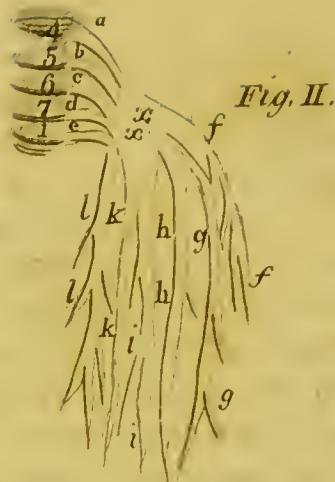
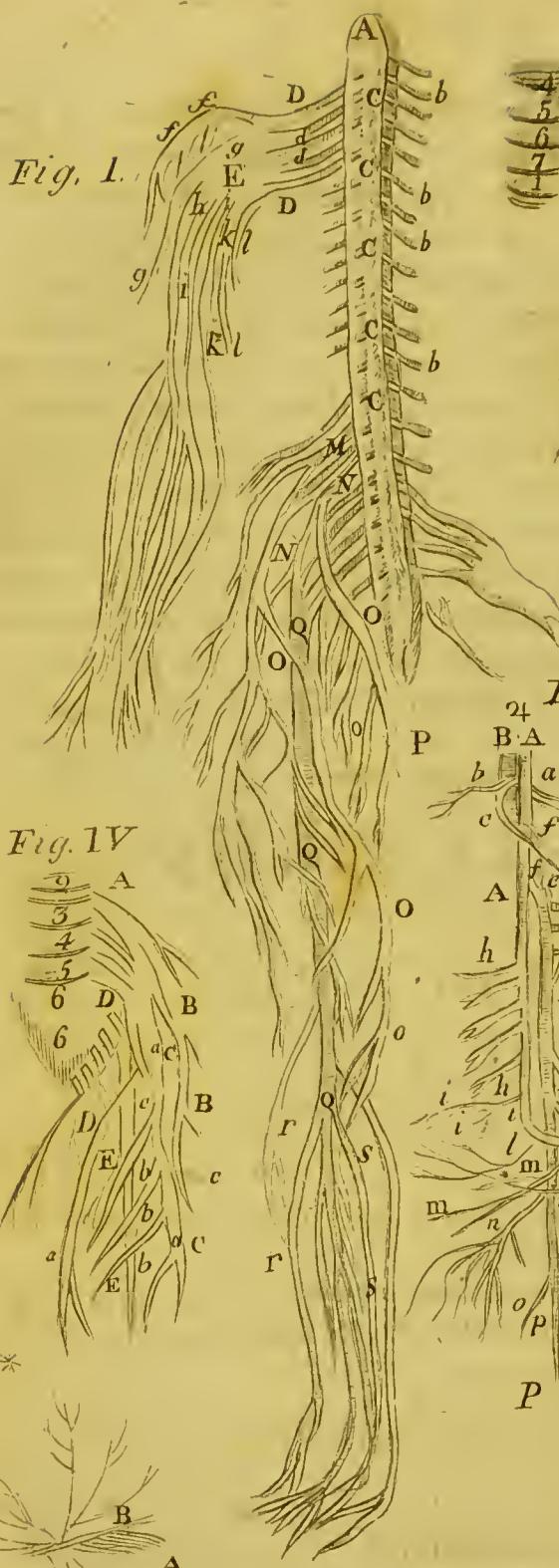
In answer to those who deny the existence of the nervous fluid, it is necessary to state the evidence of the nerves containing animal spirits. If a nerve is cut or tied by a thread, the muscle, which receives branches from it, becomes flaccid and incapable of having its fibres filled by any other means. It is, therefore, a demonstration that the nerves must contain such a liquid as gives every muscle its due substance. That there is such a spirit in the human frame is not only evincible—but its nature is clearly ascertained by chymical demonstration. Although nothing of this liquor can be gathered to examine its nature by mixing it with acids and alkalies, yet volatile alkalies, such as spirits of hartshorn, &c. being found to cheer the mind, proves that whatever is thus conveyed to the brain by the nerves, must be that which is increased. And from its acting so congenially with what the nerves contain, it appears these animal spirits possess a volatile alkali. And as volatile sulphur increases, likewise, that principle which cheers the mind

mind, whatever the nerves contain, must be of a volatile sulphurous as well as a volatile alkaline nature. From this it is found that whatever cheers or encreases our spirits, braces the nerves by their fibres being filled by an accession of their animal fluid.

There is nothing in nature bears a greater similitude to the animal spirits than vinous or ardent spirits. This is observed by *Malbranche*, in his *De inquirend. verit.* where he says, *Vinum est adeo spirituosum, ut ad spirituum animalium naturam quam proximè accedat.* i.e. Wine is so spirituous as to approach very near the nature of animal spirits. And *Friend*, observes in his *Emmenolog.* *Sp. Vini eas in se continent particulas, quæ in spiritus animales facilè migrare possunt.* Spirit of wine contains in itself such particles as can easily change into animal spirits. This appears evident from the immediate effect spirituous liquors have upon the nerves, by distending them from an encrease of their fluid, which Doctor Knight acknowledges, " is a very great reason of the near cognition between the fluids. And moreover," he says, " dephlegmated spirit of human blood, (which is an urinous one) being shaken with the same quantity of spirit of wine, it will permanently unite, notwithstanding that these two liquors do belong even to different kingdoms, the one to the animal, the other to the vegetable."

And as all encrease of the same substance depends upon an accession of similar particles to each other, the similitude of wine and its spirit to animal spirits, is evident, from the former augmenting the latter, without altering their nature. For although an ardent spirit, like that of wine, cannot be obtained from human blood, yet Mr. Boyle has proved it to be a very inflammatory body. Phosphorus being only sulphur and salt in a coagulum, and both being the product of urine, shews that the combustible matter must have been originally in the blood, from which the animal spirits





spirits are distilled. The animal spirits being the most subtle effluvium of the blood, the above observations respecting wine and phosphorus, are additional arguments in favour of this juice, which the nerves extract from it by the medium of the brain, being of a most volatile sulphurous, as well as alkaline nature.

Previous to our proceeding in an investigation of the Nervous System, it is necessary that the reader should be apprized of the anatomy of that essential part of the human frame. We have, therefore, prefixed a plate, with a brief explanation of the several references, by which every person will readily perceive the immediate connexion the most remote nerves have with the brain, where concentrate whatever affects the animal economy of human nature.

EXPLANATION

OF

PLATE THE FIRST.

FIG. 1.

A,	Beginning of the spinal marrow.
bb, bb.	Branches from it.
CCC.	The marrow itself.
DD dd.	Branches from three pair of the neck, and two of the breast.
E.	The plexure of those nerves.
ff.	First pair of nerves of the hands.
gg.	Second pair.
hh.	Third pair.
ii.	Fourth pair, larger than the rest.
kk.	Fifth pair.
ll.	Sixth pair.
M.	First nerve of the thigh.
N.	Second nerve.
O, O, O.	Branch of the second nerve going with the saphena.
P.	Third nerve of the thigh.

Q, Q, Q, Fourth

Q, Q, Q.	Fourth nerve, thicker than all the rest.
r r.	Ramus externus.
s s.	Ramus internus.

FIG. 2.

4567.	Four vertebræ of the neck.
1.	First vertebræ of the breast.
a, b, c, d, e.	Five nerves from the holes of the vertebræ.
x x.	The plexure of the nerves.
f f.	First pair of the nerves.
g g.	Second pair.
h h.	Third pair.
i i.	Fourth pair.
k k.	Fifth
l l.	Sixth pair sub cutaneous.

FIG. 3.

Per Vagum Nervorum, or nerves of the sixth, but here considered as the ninth conjugation.

γ.	The right side of the pair.
♀.	The left side of the pair.
A A.	External and greater branch.
B, B, B, B.	Internal or costal branch.
a a.	Branches carried to the neck.
b b.	Ramus externus.
c c.	Nerve of the tenth pair joined to the ninth.
d d.	A remarkable branch spread into the muscle of the os hyoides.
e e.	Branches spread into the tongue.
f f.	Smaller branches from the external branch going to the larynx.
g g g g.	Right and left recurrent nerves.
h h h h.	Branches going to the lungs and asperia arteria.
i, i, i i.	Stomach branches spread out.
l l l l.	Branches going to the caul, duodenum, liver, spleen, and colon.
m, m m m.	Branches going to the right and left kidney.
n n n n.	Branches going to the mesentery and guts.
o o.	Branches going to the os.
p p p p.	Extremities of the internal branches going to the womb and bladder.
q q, r r.	Branches from the internal bough making the plexure.

- G. Nerve from the left recurrent distributed to the pericardium and heart.
- * * *. Nerve, from the left stomach nerve, going to the liver.

FIG. 4.

CRURAL NERVES, EXPLAINED.

- 2, 3, 4, 5. Four vertebræ of the loins.
- 6, 6. Os sacrum.
- A. Pair of nerves pertaining to the transverse muscles of the abdomen.
- B B. First pair of nerves of the foot.
- C C. Second pair.
- D D. Third pair.
- E E. Fourth pair.
- a a. Branch of the second pair.
- b b. Another branch of the same.
- c c. Branch of the fourth pair going to the skin of the thigh.
- Δ. The nervous plexure of the mesenterium.

EXPLANATION OF PLATE I. CONTINUED.

- ⊕. Part of the pulmonick nerve viewed with a microscope, to shew its branchings on the lobules of the lungs.
- * A. The nerve of the fifth pair with its branches: the upper of which tend to the muscles of the eye, face, nose, palate, and the upper of the mouth. It has beside two other branches, making two of the roots of the intercostal nerve. The other lower branch of the fifth pair tends downwards, and is dispersed into the lower jaw bone, and all its parts.
- B. The nerves of the sixth pair tending strait downwards into the muscles of the eye. But of this trunk, there is a branch forming the third root of the intercostal nerve.

C H A P. II.

NATURE AND USE OF THE NERVES.

HAVING shewn the existence and nature of animal spirits, the nervous system can be more easily elucidated. It appearing that the nerves are tubuli and vehicles of a volatile liquid that pervades more or less every part of the body, they are found to be of the greatest importance in all that relates to the health of human nature. But, although it is here discovered that they are the canals of the animal spirits, yet they have two other uses. The one is to move the muscles and the other to convey sensations to the brain. The nerves are, consequently, not only the means of communicating the animating principle of existence to every part of the body, but the medium by which the frame derives its internal and external motion, with all the separate enjoyments of seeing, tasting, hearing, smelling, and feeling.

The nerves being the channels of such a subtle fluid as the animal spirits, and these being conveyed from the brain to every fibre of the body, they must graduate into an infinity of number and smallness. So that, beside those which are so large as to be traced in their progress from their two sources—the skull and the vertebræ, they must have numberless and almost imperceptible ramifications. These have been found so small and in such quantities as to cause some anatomists to consider every pore in the skin—but the orifice of a nerve. Although this is increasing the number to that of every pore internal and external of the body, yet, without admitting it to be literally true, it may be received as a proper figure of speech to illustrate their amazing quantity and minuteness. But to prove that

that the pores of the skin are not the orifices of nervous tubuli, it is only necessary to observe if they were, the mind would be in a state of excruciating torture from the pain the nerves would convey to the brain, from their being immediately touched by every thing with which the cutis, or skin, is in perpetual contact. The nerves are, however, innumerable dispersed on the dermis, or that part immediately covered by the epidermis or outward skin, which is the defence nature has bountifully provided against their being liable to perpetual irritation. From their being the medium of feeling as well as the other senses, wherever the skin is lost the severest sensation of pain is immediately felt on the part being touched. That the nerves almost cover, by their infinite foldings, all the body underneath the epidermis or scarf skin, is evinced by the pain caused by so small a part being touched as the point of a needle. If, when the skin is pierced, a nerve was not touched, the mind would not experience the least sense of pain. And as it is impossible to wound any part of the body with the least point imaginable, without the brain feeling a tormenting sensation, it is evident that what is covered by the skin has scarcely a part free from a nervous fibre. To this is owing that feeling which the minutest parts of the body experience when in contact with cold or hot, moist or dry, hard or soft, rough or smooth. And such is their extreme sensibility, that, although they are covered by the skin, yet they convey such a difference of sensation to the brain as to enable the mind to judge of whatever touches the epidermis, without being immediately in contact themselves. From this the mind acquires all the intelligence that it derives from externals affecting the senses. Without this means of conveying information, the mind could never have had the least idea of any thing. Day and night, summer and winter, heat and cold, beauty and deformity, and all that the world now presents to man

by

by the communication of the optic, auditory, olfactory nerves, and those of tasting and feeling would have been unknown. And as Locke has clearly proved that all ideas originate in the senses, the nerves must be the source of intellectual as well as sensual knowledge. From what is above observed, the nature of the nerves is that of being, in their greater parts, capable of moving the muscles, and divisible into the minutest fibrillæ. Their use appears to be the conveyance of motion to the muscles, sensations to the brain, and animation to the whole economy of human nature. The manner in which the nerves convey motion to the muscles is by imitating their oscillatory power which causes them to contract towards the middle, and, thus, shorten their extension and increase their thickness and hardness. This motion being alternate, is so great, Valli observes, as to elude all calculation. And this alternate oscillation ceases not until it has performed a series of contractions and relaxations. The fibre, then recovering its tone, is restored to its former length, laxity, and smoothness. The muscles, themselves become thicker and rougher in proportion as these effects are produced by the irritation of the fibres.

Although Monro observes that the nerves derive their energy and principle of life independently of the brain, yet all our sensations prove that, if the brain be admitted as the general sensorium, it is a passive—if not an active principle, by which we obtain all knowledge of external and internal impulses.

Admitting that the great quantity of blood which goes to the brain is not destined for the general secretion of the nervous fluid, but for the purpose of furnishing materials to preserve so large a mass as the brain, yet we cannot but think with Dr. Valli, that the blood vessels have most probably another office. And that this office is that of separating the electric fluid in the brain, which is to be understood not only what

what is in the cranium, but also what the medulla spinalis or nerves contain.

As a confirmation of what we have stated respecting the reciprocal connexion between the brain and the nerves being the great cause of all our sensitive and intellectual knowledge, we state the following particulars from the above author :

He observes that the air in particular ought, at least in animals, to have an abundance of the electric fluid ; for this gives efficiency to genius, and it exercises its influence in different parts of the body. A want of this fluid ought to diminish in man his strength, acuteness, and activity. In such individuals as abound with it, he justly observes, that the imagination is fertile, its images happy and beautiful, and that such are exquisite painters of characters, passions, and of nature. Children who abound with this fire, discover and mimic the ridiculous in person or behaviour. Those people who have the most vivacity (and this vivacity, *ceteris paribus*, proceeds from the nervous fluid) are particularly good mimics. Campanella knowing how to assume the countenance, manner, and gestures of the people whom he intended to examine, was enabled to enter into their thoughts and inclinations as effectually as if he had been changed into the very person he examined.

When the secretions of this electric matter in the brain are by any cause augmented, the whole animal functions are more prompt and energetic ; sometimes they are even very violent. Similar to our observation of the affinity of wine to the animal spirits, which are encreased by this beverage moderately taken, this Physician observes, wine animates the phlegmatic and indolent. He also adds, that shocks invigorate them, gives them wit and humour, and inspires them with raillery and repartee.

The following instances, judiciously selected by him from different professors, are, from their curious na-

ture and illustration of the power of the nerves over the senses, deserving particular attention.

In the work of an English author*, he says there is a history of a person, by receiving a blow upon the head, acquired a degree of understanding he never before possessed. But what is more remarkable, that his new attainment left him as soon as he recovered.

Hysterical women have, in some of their nervous attacks, spoken languages they could not speak when in health†. Maniacs and hypochondriacs, and all those whose brain may be said to be in a state of orgasm, are most capable of extraordinary bodily exertions, and enduring cold, hunger, fatigue, and watching. Some of those have periodical attacks, which seem to arise from an encrease of electricity in the brain. He was informed by Dr. Simmons, who has been in the habit of treating people of deranged understanding, that he has observed that, after they have been for some time in a state of tranquility, they, without any obvious cause, became uneasy, restless, and quarrelsome, and were seized with paroxysms of rage and anger.

This tumult subsiding, by degrees, they resumed their former tranquility. Thus, after the horrors of the tempest, the air becomes calm and the sky recovers its serenity. On the subject the Doctor observes, that there is not any instant in life in which the brain ceases to act. He, therefore, concludes that the electricity by which it acts, ought to exist constantly in the brain, although not in perfect equilibrium—but, as the Italians more emphatically express it, in *sbilancio*. He further supposes that it exists, likewise, in the same manner in the spinal marrow and nerves, with the difference that, except under certain circumstances, it is not excited in some of the nerves. Without dwelling further upon this theory, he contents himself with observing that the brain, spinal marrow, and nerves, have a specific constitution,

* Robinson on the Spleen.

† Tissot, Maladies des Nerves.

stitution, on which alone the mode of electricity in each of them depends. Although the principle most certainly exists, yet we perfectly agree with this ingenious author, that no reasoning or experiment can ever explain the cause of the fluid not maintaining an equilibrium, or of its being found in a state for constant action, or for acting only under certain circumstances.

C H A P. III.

OFFICES OF THE GREATER NERVES.

A Nerve is a long and small bundle of very fine tubes or hollow fibres. The medullary substance of the brain is the beginning of all the nerves, and, it is probable, each fibre of the nerve corresponds with a particular part of the brain at one end, and a particular part of the body at the other end. By this means, whenever an impression is made upon such a part of the brain, the soul knows the part of the body which is affected.

The nerves accompany the arteries through all the body—but not, as some imagine, to keep the animal spirits warm by the continual heat and pulse of the arteries. For the nervous juice we have found to be of such a sulphurous nature as to possess sufficient warmth in itself. It rather seems that the nerves accompanying the arteries, is designed by nature to contribute, by the heat of the animal spirits, that motion to the blood in the arteries which may be the first means of its incalation. — The nerves have also blood vessels as well as the other parts of the body. These vessels are not only spread upon their coats, but they

B 2

run

I do not know what you mean; neither,
do I think that you know it yourself!!!
You appear to be a man, sleeping in
sleep.

run also among their medullary fibres, as may be seen among the fibres of the retina.

Our opinion respecting the nerves not receiving their animating principle from their attendance on the arteries, is still more confirmed by the electrical experiments to which we have before alluded. From the evidence adduced by Dr. Valli, of the existence of the electric fluid in the nerves, there can be no necessity to resort to the arteries for their vivifying energy. Such is the heat and animating nature of the fluid derived from electricity, that it may not be presuming to consider it as the universal principle of life and motion in all sublunary beings. For, according to our author, if magnetism be an effect of electricity, is it not a further proof that the latter is capable of producing phenomena in bodies according to their quality and structure? But in order to prove more forcibly the identity of the electric principle in animals, he considers as follows, their mode of sensations :

“ Let us imagine ourselves, says he, placed upon the summit of a lofty mountain, which commands the prospect of an immense plain, presenting us with a world at one view. A thousand different objects present themselves at the same moment, and a thousand different impressions are in the same instant made upon the brain, although we have not distinct ideas of all of them. A man who has an ear for music, hears a variety of tones and voices at the same instant, yet can detect the least error in the measure of time, or in the accord of sound.”*

He then asks, by what medium the impressions made upon the retina and upon the membrana tympani, are extended to the brain? And how all the other impressions on the nerves are communicated to the sensuum? He answers, that Newton, to solve this problem, had recourse to the oscillations of æther, which, according to this great philosopher, was the cause

of

* Animal Electricity, p. 248.

of all the motions in the universe. But Dr. Valli observes, that as this æther is not generally known, and as electricity explains these phenomena sufficiently, he substitutes the last mentioned agent for the æther of Newton. However, as this is a subject of the first importance in the system of the nerves, we shall transcribe the passages from the great philosopher, on the subject of visual and auditory sensation, from the second edition of his *Optics*, page 328.—

“ Is not vision performed by the vibrations of this medium, excited in the bottom of the eye by the rays of light, and propagated through the solid, pellucid, and uniform capillamenta of the optic nerves, to the place of sensation? And is not hearing performed by the vibrations either of this or some other medium, excited in the auditory nerves by the tremors of the air, and propagated through the solid, pellucid, and uniform capillamenta of those nerves into the place of sensation? And so of the other senses.”

“ Is not animal motion performed by the vibration of this medium, excited in the brain, by the power of the will, and propagated from thence through the solid, pellucid, and uniform capillamenta of the nerves into the muscles for contracting them? I suppose that the capillamenta of the nerves are each of them solid and uniform, that the vibrating motion of the *ætherial medium* may be propagated along them from one to the other uniformly, and without interruption.”

Although we have, in the beginning of this *Essay*, stated our objection to the opinion of Sir Isaac Newton, Vesalius, Aquapendente, and Leevenhoek, who deny the cavity of the nerves, yet it appears to us, that Sir Isaac has, in the latter part of the above observations, described the operation of electricity—although he has not expressed definitely the principle. By supposing that the motion of the *ætherial medium* may be propagated along the capillamenta of the

nerves, he acknowledges the electric effect of the subtle effluvia passing along any conducting wires to its destined collector.

But Dr. Valli has more particularly explained the operation and principle in the following passage.

“ Since the medullary substance of the brain is of a fibrous composition, the threads of which are disposed in a parallel direction, as is particularly obvious even to the naked eye in the corpora striata, the thalami of the optic nerves, especially of fishes, in the fornix when immersed in nitrous acid for some time; since there are nerves sufficiently manifest, as in the seventh and fifth pair (V. Haller, *Prim. Len. Phys.* with notis Prof. Wrisbctg.) we must consider nerves as an assemblage of parallel fibres.”

“ These threads or fibres are so many electrophori. The electricity of each is excited apart, and each apart impresses a stroke upon the brain, which is proportioned to the impulsion they receive, and to the excitement of their electrical matter. In this every one excites numberless distinct impressions.

Not only several impressions are made at the same time upon, but they are effected with a rapidity which belongs uniquely to the electrical fluid. One may hear three or four sounds in succession, very distinctly, in the space of a quarter of a second. Between the time of touching a body, and the consciousness of such a touching taking place, there is not any intermediate space which can be calculated by the known measures of time. Notwithstanding, it appears, that sometimes this fluid does not possess its ordinary velocity; but even common electricity has sometimes a loitering pace, not easily reconcilable, with its common immeasurable velocity.”*

Having described by a plate the anatomical situation of the principal nerves, it is unnecessary to enter here into a particular detail of their situation.

We

* Valli’s *Animal Electricity*, p. 245.

We shall, therefore, curiously remark their internal and external offices in the body.

In referring to the greater nerves, it is meant to enquire into the offices of those which are visibly the cause of most of the other animal functions, as well as muscular motion.

The connexion which the nerves have with the muscles, seems to be for the two purposes of conveying animal spirits to the blood contained in the veins and arteries of the said muscles, and to contract or dilate them by an active energy they possess by nature for the purpose.

The nerves supply the lymphatick vessels with animal spirits, which are thus conveyed into the veins from every part of the body. This shews how essential to the first principles of life, is the perfect state of the Nervous System. For, if they are injured, the veins must be deprived of that fluid which serves to animate, and, perhaps, is the first cause of their motion. Thus, the animal body is never better nourished than when all its parts are full of circulating fluids. And the lympha being that which flows amongst the fibres of the solid parts, and fills up their interstices, it abundantly supplies the body with nourishment.

The great number of nerves which are about the upper orifice of the stomach, renders it extremely sensible, and causes that sympathetic connexion which is between the stomach, heart, and head: this sympathy is so great, as to have caused Van Helment to think that the soul had its seat in the upper orifice of the stomach.

Agreeably to this observation of the great sympathy there is between the stomach, heart, and head, Dr. Valli justly states, " that the passions in general render the senses more delicate and exquisite, and, in this situation, the slightest causes may disconcert both the physical and moral parts." He further observes, " that

“ that irritation of certain parts of the body do the same, particularly of those organs endued with much sensibility, and which sympathize with the rest of the system as the stomach and uterus.”

As instances of the above sympathetic effects upon the nerves by the disease of the stomach, he states with regard to himself. When he experiences an indigestion, the merest trifles give him uneasiness, and, the mind being equally irritable, he becomes fretful, petulant, uncivil, and intolerable. He thinks, therefore, that the demon which afflicted Saul, was probably a bad state of the stomach. A prince, a general, a judge, a physician, he says, are very redoubtable and dangerous beings in the moment of indigestion.

The plexus nervosus of the hypochondria and mesenterium, convey several branches to the bottom of the stomach, which is therefore affected in all hysterical and hypochondriacal complaints. This accounts for the indigestion which generally attends all nervous affections.

From the filaments of the nerves entering obliquely into the œsophagus, the peristaltick motion is effected that causes our food to be conveyed into the stomach. It is, therefore, when the nerves are affected by irritation or debility, disagreeable sensations are perceived in the throat. And were it not for the peristaltick motion, our food would be liable to stop the passage of the œsophagus.

The two nerves which enter into the liver, where they form with the arteries innumerable branches throughout the whole substance of the liver, seem to be for the purpose of conveying the animal spirits, so as to promote the secretions of the bile. And as they form a net which enfolds the arteries, the sulphurous warmth of the animal spirits must aid the incandescence of the blood. If, therefore, the nerves are debilitated, the liver must be deprived of sufficient energy, to separate the bile from the blood. Thus is per-

perceived the cause of all those bilious complaints, which are more or less attendant on nervous diseases. And here it may be observed, that the elements of the bile, consisting of much fixed alkali, and phlegm, beside a like volatile alkali, sulphur and earth, its use is to perfect the chyle. For as alkalies dissolve sulphurs, and phlegm is diluting, the sulphurs of the chyle are dissolved by the alkalies, and its whole substance diluted by the phlegm of the bile. Thus is the chyle preserved from coagulation, and rendered so liquid by the aid also of a fluid, called the pancreatic juice, as to be capable of passing into the small vessels, called the lacteal veins. This is an additional evidence of what remote diseases, the debility of the nerves may occasion. From the chyle not being properly prepared, the body is deprived of its principal nourishment, and is, therefore, liable to all those complaints which end in all kinds of wastings and consumptions.

Many nerves which arise from the vertebræ of the loins, and from the intercostal, are so interwoven one with another upon the mesentery,* as to form a plexus, called the mesenterick plexus. Many nervous fibres branch from this, and spread amongst the fibres of the membranes of the mesentery. The use of these nerves is to convey abundance of animal spirits to the chyle, which fills the numerous lacteals of the mesentery. Thus is the chyle rendered more subtle and fluid by the volatile alkali of the animal spirits. And if there be any acidity in the chyle, it is by the same alkalies corrected and changed into salts. This further evinces of what use the nerves are in the support and nourishment of the human frame, and, therefore, the danger arising from their being disordered.

The

* A membranous ruff to the circumference of which the intestines adhere.

The nerves which the heart receives from the plexus cardiacus, and the par vagum, aid considerably the passage of the blood. They appear to be the cause of the auricles being full of blood, when the ventricles are empty. The animal spirits being forced out of their fibres into the auricles, when they are full of blood, complete their contraction. As soon as the auricles are thus contracted, the blood advancing on all sides, and joined with the spring of the nervous fibres, restores the auricles to their former state. The animal spirits passing, at that moment, from the auricles to the heart, causes its contraction. In this manner, the auricles are empty when the ventricles are filled, and the ventricles are empty when the auricles are filled. The nerves being so necessary to effect the passage of the blood from the heart, proves what dangers may arise from sudden spasms of the nerves. To this may be owing the falling sickness, palsies, apoplexies, and all deadly afflictions, arising from the nerves being suddenly suspended in their office of contributing to the passage of the blood, from the ventricles to the arteries.

C H A P. IV.

OFFICES OF THE GREATER NERVES FURTHER CONSIDERED.

THE filaments of nerves which are observed to lose themselves in the vesicles of the lungs, seem to contribute by the energy of their animal spirits, to cause the power of respiration, or the ingress and egress of the air in our bodies. The vessels being filled with the animal spirits, must cause the fibres of the

the lungs to contract, and thus press out the air, which has no sooner left the lungs, than fresh air immediately fills the vacuity. For it is the principle of air to leave no vacuum. From the energy of the nerves greatly depends that free respiration, which is not only so essential to our health—but even to our existence. The lungs being enabled, by the vigour and activity of the animal spirits, to contract themselves so as to force out the air it has inspired, is thus prepared to receive a fresh supply. As this vital principle is so indispensable to our preservation, a few further remarks, on its effects on the blood, may not be thought uninteresting.

There being found a great difference between the blood which enters the lungs and that which leaves it, proves that the air must impart to it some peculiar qualities, which may explain further benefits derived from it than merely the power of breathing.

That blood which enters by the pulmonary artery, is of a deep red, while that which returns from the lungs by the pulmonary vein, is of a light red. This may be derived from two causes, the one, from the nitrous particles of the air, and the other, from the alkalies contained in the animal spirits. The blood, therefore, in its passage through the lungs, is rendered more subtle, more agitated, and more rarified, and thus more proper for the rest of the circulation. This must create that equal temperament of the blood, which constitutes the first means of health.

The pressure of the air upon the blood vessels must also operate considerably, to render it fit for nutrition and secretion. By this compression, which has been found to equal that of 100lb. weight, the red globules of the blood, from their languid motion in the veins, being grown too large to circulate in the fine capillary vessels, must be broken and divided again in the serum. This proves the great effect which the lungs produce on the blood by the pressure, as well

as

as the nitrous particles of the air. But here it must be stated, that the air does not enter the blood vessels in inspiration; for it requires a considerable pressure to force it through their pores. This is, therefore, effected in expiration, when the air presses the lungs; for if it went easily out again the way it came in, that necessary attrition of the blood could not be performed.

As nothing enters into the spleen but animal spirits from the nerves, and blood from the arteries, the use, if it has any, must be greatly dependent on the state of the nervous system. As there goes nothing but the lympha into the reservatory of the chyle, and the blood from the splenical veins, and neither appearing to have any other quality than what they had before they entered the spleen, Anatomists have found it difficult to ascertain its necessity in the body. For if the arteries bring blood to it, it appears only to nourish it; and if the nerves supply it with animal spirits, it can only be to give the nutritive juice the necessary fluidity. So that both seem merely employed to supply, in this instance, the spleen with nourishment. But, however, from what is to be observed in all the productions of nature, it cannot be deemed entirely useless. It is not probable that an useless part should always be found of the same form, and in the same situation, in the body of a living creature. Nature would scarcely have been so uniformly exact in its place and construction, had it not been for some purpose. It is, therefore, probable, it is of some essential service in the animal economy. If it be, its effects must, in a great measure, depend on the perfect state of the nerves, by which it is supplied with animal spirits. It may be supposed that a ferment distils from the vesicles of the glandules, and that it mingle with blood passing through the spleen. The nature of this ferment may be such, as to separate from the other parts, those which are proper to compose

compose the bile. The reason for this opinion is, from the blood going from the spleen, passing into the vena porta, and from thence to the liver, where it is known to deposit those parts which are proper to compose the bile.

From the disease of the spleen, by the debility of the nerves causing melancholy, the ancients thought it the receptacle of the melancholick humour. Others have thought, from its having a number of fibres, membranes, and many nerves, that the blood became more attenuated and spirituous in the spleen ; and considering, that most of the blood in the liver comes immediately from the spleen and omentum, they thought, and, perhaps, with truth, that the one furnished the oleaginous, and the other the spirituous part of the bile. But, however, this may be, an animal living many years after taking out the spleen, cannot be admitted as a solid argument against its use. For the cutting out the pancreas, which has uses that are known, and which are acknowledged to be most necessary for maintaining the animal economy, does not hinder a dog from living many years. So that, although its positive use cannot be ascertained, yet there is no solid proof to be brought against its necessity in the human frame. And whatever is its office, the nerves, as above observed, are in this, as in every other animal function, essentially serviceable.

Without entering into a further enquiry into the uses of the nerves in the animal economy, that would extend to a volume itself, our observations are necessarily confined to the above particulars, in order to adduce physical demonstration of the nerves being the first causes of either health or disease.

C H A P. V.

PROPERTIES OF THE NERVES. *et*

IN the smallest vessels, the proportion of solid to the fluid it contains, increases as the vessels become finer—which is the cause of the exterior parts being more solid, from consisting of more and finer vessels.

The power of a last solid on the contained fluid, is only an endeavour to contract itself, which is the efficient cause of promoting the motion of the fluid. For the more the solid is prolonged, the more its diameter must be contracted, and thus must the motion of the fluid be proportionably accelerated. For instance, let Λ G , and C H , Fig. 1, Plate II, be two parallel lines infinitely extended. From the points C to A , and D to B , erect two parallel perpendiculars. Then draw the lines C B , C E , C F , D E , and D F . It is manifest from Euclid,* that the parallelogram A B C D , is equal to that of C D E F ; and that the triangle B C D , is equal to that of C D E , although the sides of the parallelogram A B C D , and the sides of the triangle B C D , are less than the sides of the parallelogram C D E F , and the sides of the triangle C D E . As this happens with cylinders and cones, which are the two forms of the vessels of the body, it is manifest they must be more contracted the more they are prolonged. All the force, therefore, of the smallest solids on their fluids, depends on the force contracting those vessels or solids. The power of all the greater vessels arises from the aggregated force of the smallest; for every nerve, vein, and artery has its force

* Book I. Prop. 35.

force from its fides, which are composed of the smallest vessels.

Thus all nutrition is made only in the smallest nervous vessels, and not in the greater, as in the arteries, veins, glands, lymphatic, and adipose vessels; for the augmentation of the greater entirely depends on the extension of the smallest lateral vessels, which are nervous tubuli. Therefore nutrition, which is only the application of any part to the place of a wasted part is effected, in those smallest canals of which the greater consist. It follows, consequently, as we may hereafter have occasion to state, that all medicines, whether destined to supply, evacuate, or alter, must be such as are capable of entering into the smallest vessels, where they can only act as the means of health or averting disease.

Every change in the fluids is made in the smallest vessels, and is owing to the force of them, and the nature of the liquids themselves. There is a force in all the fides of flexible canals, by which the parts endeavour to approach each other, so as to become shorter than the line of direction appropriated to the fibre: and this force is found in the point of every fibre. This is stated to shew that the nerves do not derive their power of moving the muscles by the medium of their animal spirits, but from a certain active energy they have in themselves. This force, by which the parts endeavour to contract themselves, is restrained by the points of the distending liquid. This power acts truly and physically, even at the time in which the fibre seems most at rest: for example. Fig. 2. Let \textcircled{M} be some fixed point, or nail in a wall, from which suspend the weight D by the music string B; hang to another string fixed to the former, at the point D, another weight, passing over a pulley, fixed in the wall, as \textcircled{P} ; the latter weight should be hung so as the force of the former, should exceed the latter, in order to prevent the bending of the string

String C. Having placed these weights, cut with a very sharp knife, the string C, between the point C, and the weight, so as not to impress any motion on the string. The upper part, A C of the string, will immediately contract itself, so as to raise up a little, the other weight. It is manifest, therefore, that the string, before the division exercises its contractile power, although it is prevented from contracting itself by the weight hung to it, yet it is always in a state of active energy. This power is the same in the nervous fibres of the body, which may be seen in a fibre cut transversely; for it contracts itself towards its fixed points, and thus causes that gaping of all wounds made in the body.

That force, which any part of the body exercises to contract itself, is balanced by the antagonistic force; for all the parts having the contractile power, which, drawing towards opposite points, must balance each other. This balance depends upon the equal influx of the liquid, and its impulse on all parts, so as to distend them equally. From this principle of the nerves, may be discovered that health chiefly depends on the regular motions of the solids, and that when this is diminished, the animal functions become languid, nutrition is prevented, and all the frame falls into a rapid state of decline. But when the motions of the nervous tubuli are too violent, fevers, deliriums, and even madness may be the consequence.

It is evident, therefore, that the means of preserving or restoring the constitution, must greatly depend on the temperate equilibrium of animal motion.

As whatever destroys the force of resistance in the canals, must destroy it in the whole body; disease frequently ensues when the equilibrium of the oscillatory motions are diminished.

But to shew more clearly what principally alters this balance of the nervous motion, the following observations,

vations and examples respecting the effects of acrid or viscid particles entering the smallest vessels, are presented.

The balance of this essential motion to health is never more destroyed than when some acrid has insinuated itself with the liquids and sticks in the sides of the small tubuli.

Microscopes have discovered that acrids consist of several points, forming edges like that of a knife or a sword; this causes them to gnaw, prick, and cut, like so many little wedges in the small points of resistance.

Should an acrid be infixed in the side of any vessel, the whole force of the liquid which used to act on the sides, is now impelled to that point where the acrid is fixed, and causes a convulsion of that canal; it is thus demonstrated:—In Fig. 3. A,B,C, is a portion of any vessel in which the lines describe the flowing of the liquid through the canal; the line from D impinges upon E, and that which is drawn from F impinges upon G; all these lines are supposed to represent liquids flowing, impelling, and distending, with equal force, the points on which they impinge; and as the canal is contractile, those points contract themselves equally so as to resist the impulse in such a manner as to preserve the oscillatory motion. But if any acrid particle, as H,I, is fixed into the side at the point I, it cannot be moved from this point by the flowing in of the liquid, because the pressure from the part H,C, is equal to that from the part B,H. Thus, the fluid that is contained between B,H, will rush on the surface H,I, which will sustain the whole force that ought to be sustained by the whole length from I. to K. And all the force that is impressed on H,I, is communicated to the point I, which, as the canal is flexible, must give way from being more pressed than the other points of the same side. And as the canal is also elastic, the more it is pressed with the greater force it restores

itself, which, thus destroying the balance of the oscillatory motion, causes convulsive motions in the vessel. Bodies producing this effect, are chiefly volatile and fixed acrid salts, and the corrosive particles of metals*, which hurt from their figure being like the wedge H, I, and affecting the body more as solids than fluids.

From this it appears that the stiffer and less flexible the infixed particle is, and the deeper it is infixed, the more dangerous must be its effects. Particles of metals, therefore, reduced to an acute figure by corrosion, must produce the worst of consequences in the human body. The heavier the particle is, the more disease it must cause, from the greater difficulty of removing it. And whenever it happens that the influx of humours ceases, there also is lost the whole force of medicines. For when even a caustic is applied to sick persons reduced to extremity, and almost expiring, it can scarcely act with the least effect, from the circulation of the humours continuing only near the heart. But apply the same caustic to a sound and vigorous body, it operates immediately. This is stated to shew the danger of not seeking speedy remedies for all those acrid distempers which obstruct the motions of the liquids, and disorder the tone of the solids.

Liquids passing in parallel lines through cylindrical as well as conical vessels, the acrid particle has a milder effect in the former than in the latter. For the force of the liquid on the infixed particle at E, Fig. 4, if it be a little pressed towards G, will pass towards B D, where it will find a space equal to the former A C. But it is different in the conical vessels; for in Fig. 5, the fluid which runs from the part A D C, on the particle F, after passing between G and the said particle, finding a less space than that it left, is more violently pressed in flowing towards B, than it was in the cylinder. Let us next suppose an inverse motion of the liquids in Fig. 6, in the conical vessel A B C D, which

* See the annexed Enquiry into the Nature of Foreign Teas.

which may be here considered as a vein. The liquor flowing from A B, impinges only in a few points on the particle F, and will impel it a little towards D, and will consequently make it pass from the space between G and the particle being greater than A B, and the liquor not having so much resistance on that side. The force, therefore, impressed on the particle by the fluid running in is, in this instance, scarcely any : acrids, therefore, are less injurious in the veins than the arteries ; for they never act less on the solids than when they are applied to a cavity growing broader from a narrow beginning.

If any acrid adheres externally to the side of a vessel, it produces the same effect as if it happened internally ; for the point in Fig. 7, must necessarily be distended by the liquid flowing in, and equally pressing the canal A B, and, therefore, it will press the adhering particle D, and strive against it. But when, from the pressure of the atmosphere or any other cause, it cannot be removed, it must necessarily penetrate the side of the vessel, and hinder the equal motion of the fluids. In this manner all plaisters and stimulating medicines applied externally, act upon the human body. Thus it may be inferred, that the action of medicines consists in removing impediments to the equal motion of the fluids.

By this position alone of one particle, all the rest remaining in their natural state, the secretions may be altered and disturbed, the canals dilated, the concussive force of the sides increased, and the oscillatory motion destroyed.

Having thus exemplified the manner in which acrids act upon the solids of the arterial and venal vessels, we shall add an instance, shewing in what manner the viscid operate.

A viscid is that which tenaciously adheres to the side of a vessel, without being able to penetrate or lacerate

cerate its surface, which alone distinguishes it from an acrid.

A viscid may adhere two ways to the side of a vessel: it either touches the sides only in one part, as A, Fig. 8, or all around, as at H, *ibid.* The effects of this viscid, in both instances, are explained in the said figure. Let A D be a viscid particle, so tenaciously adhering to the vessel, as not to be moved by the liquid running in the lines E I and E F. It will, therefore, sustain the whole force of the liquor that should be sustained by the part of the side between A H. The part of the side to which the particle adheres, will recede outward, until by a greater force it restores itself. This violent energy, destroying the balance of the oscillatory motion, causes an obtuse pain, which distinguishes all disorders that arise from viscid humours. Let us next suppose the viscid particle touches the vessel all around, as at H, in the same figure. With regard to the vessel to which it adheres, it operates as a total obstruction, and, at the same time, a distension of all the sides of a vessel. There being a balance effected between the liquids pressing on each side of the viscid, it remains unmoved, and therefore stops the cavity, which is the cause of the sides of the vessel being distended, and the circulation of the fluids impeded.

Having taking this view of the nerves, and the manner by which their regular motions are destroyed by acrid and viscid humours, we beg leave to conclude this Treatise, by an Enquiry into the nature of Foreign Teas, by which our readers will be able to judge, whether they are or not the cause of those innumerable complaints that are ranked under the title of nervous affections, to the great detriment of the health and happiness of human nature.

ADVERTISEMENT

TO THE.

FOREIGN TEAS.

HAVING, in the preceding enquiry, traced, from the system of the nerves, that on their state the health of the constitution chiefly depends, our immediate concern is next to ascertain what kind of food, we either adopt from choice, custom, or necessity, is the most likely to destroy the economy of the nerves. And as Foreign Teas have long been censured as being the immediate cause of the many disorders which arise from the nerves being disarranged or debilitated, an impartial enquiry is here made into the nature, preparation, and effects of these Teas. By this investigation, it will appear that Teas imported from China and India are the most injurious of any beverage that can possibly be taken as a general and constant aliment. But not prematurely to anticipate any part of the following subject, the Reader is most respectfully referred to the following pages for further evidence.

INTRODUCTION.

AS two of the four meals that form our daily subsistence are chiefly composed of tea, an enquiry into what kind is the most salutary must be as necessary as it may prove interesting and beneficial. For, on the choice of proper or improper tea, must greatly depend the health or disease of the public in general. To this may be attributed the constitution being either preserved from that innumerable train of afflictions, which arise from too great a relaxation of the nervous system by acute distempers, misfortunes, &c. or being so debilitated by excessive drinking of India Tea, as to

render it alone the prey of melancholy, palsies, epilepsies, night-mares, swoonings, flatulencies, low spirits, hysterick, and hypochondriacal affections. For tea that is pernicious is not only poison to those who, from any cause of corporal debility or mental affliction, are liable to the above diseases,—but it is also too frequently found to render the most healthy victims of these alarming complaints. And as nervous disorders are the most complicated in their distressing circumstances, the greater care should be taken to avoid such aliments as produce them, as well as to choose those which are the most proper for their relief and prevention. Those who are now suffering from the inconsiderate use of improper tea, what pitiable objects of distress and disease do they not present for the caution of those who may, timely, preserve themselves? Nervous disorders are the most formidable, by being the most numerous in their attacks upon the human frame. Every moment, comparatively speaking, produces some new distress of mind or body. The imagination cannot avoid the horrors of its own creation, while the memory is harrassed with the shadows of departed pleasures which serve but to encrease the pain of existing torments. All the endearments of life are vanished to the poor wretch who sees himself surrounded by the spectres of dismay, terror, despondency, and melancholy. And such are but the thousandth part of the afflictions that are to be avoided or produced by the choice of the prevailing beverage of tea. Not only the innumerable train of nervous afflictions, but all those disorders that arise from an improper temperature of the fluids may be produced from the action, corrosion, and stimulation of pernicious teas. In proportion to the state of the fluids, in particular constitutions, they may either prove too relaxing or astrigent, too condensing or attenuating, and too acrid or viscid: for India teas, that to some constitutions are very diluting, may produce in others contrary effects.

effects. Therefore, such should be chosen as possess a combination of quality that may render them, as nearly as possible, to a general specific. But this cannot be well expected where one simple ingredient is used, and that is distinguished for its particular qualities, which, if wholesome, can only be such to those whose fluids are so by nature or circumstances, as to require such a particular assistant; for to every other state of the fluids they must be pernicious. It is consequently evident, that if teas imported from India have any virtues, they cannot be such as to render them worthy of being universally adopted as a general aliment. If wholesome to a few, they must be pernicious to the rest of mankind, with whose constitutions they have no congeniality, medicinal, or alimentary virtue. Supposing they may possess some physical properties like all other medicines, they can only benefit such disorders as nature particularly formed them to relieve. Those who have been advocates for their positive virtues, have, in this instance, but more confirmed the impropriety of adopting them as a general morning and evening beverage. This only explains more evidently the cause of so many being injured, where one is benefited, by drinking constantly India tea. There cannot possibly be stated a more self-evident proposition than where any simple or combined matter is adopted for a particular purpose, it must, in every opposite instance, prove injurious. In proportion, therefore, to such particular qualities, they are the more improper to be generally and indiscriminately adopted. This observation, although it may be applied to every art or science, is still more applicable to physic. Thus is it found that no medicine can be safely taken as a constant and general aliment. Even those who, at first, might find it beneficial in their respective complaints, have too frequently found the constant use of it afterwards hurtful to the constitution it had before relieved.

relieved. It may be deduced from the above considerations, that India teas, however physically beneficial, to allow them all their best of praise, must be as an aliment generally injurious. Instead of preserving health, they sow innumerable disorders, which can only be cured by substituting a beverage from such salutary native or exotic herbs as are formed for the particular afflictions the former have so pitifully brought upon the too greater part of mankind.

As almost every disorder to which the human frame is liable may be retarded in its cure, if not confirmed in the constitution by the power of secretion being weakened, India teas are the most dangerous that can be possibly used as a general beverage. By too much dilating the canals, the concussive force of the fides are encreased, which destroys the oscillatory motion, and thus are the secretions altered and disturbed; and as the action of medicines consists in removing impediments to the equal motion of the fluids, the greater care should be taken to abstain from all food or drink that may encrease those impediments. That India teas not only encrease but occasion such evils is evident, from their having been experienced to relax the tone and reduce the consistence of the solids. As the powers of secretion depend upon the just equilibrium of force between the solids and the liquids, the latter must, in the above instance, make a greater *impetus* upon one part than another, from which proceeds that morbid state so justly and emphatically termed disease. Thus, according to the learned Boerhaave, to heal is to take away the disease from the body; that is, to remove and expel the causes which hinder the equal motion or transflux. Medicines, he says, are those mechanical instruments by which an artist may remove the causes of the balance being destroyed, and thus re-instate the lost equilibrium of the solids and liquids. He, therefore, concludes that a medicine supposes a flowing of the humours or liquids; that it operates mecha-

mechanically; that it acts only mediately; that its good or bad effects depend entirely on the bulk, motion, and figure of the acting particles, and that the destruction of the balance must be deduced from the solids. So that, as it has been found that the solids are wasted and impaired by the constant use of India tea, the chief cause of disease, in general, may be attributed to such a pernicious custom; even the properties which he ascribes to medicine are in direct opposition to what have been found to be the prevailing effects of teas imported into Europe. It is consequently evident, that the drinking of this injurious tea being not only, in its operation, productive of disease in its general sense, but also repugnant to the salutary operation of medicine, it is the most dangerous beverage that can be generally taken; for it appears, from the above consideration, that its pernicious effects are not confined to any system of disorders; it is found inimical to the first principles of health, and, therefore, may be justly dreaded as capable of being the source of disease indefinitely understood.

Having thus stated, as an introduction to this Essay on Teas, the general tendency of those imported from India, under the titles of Green, Souchong, and Bohea, to injure the constitution, the following pages will be particularly devoted to the consideration of the nature, preparation, and manner of using, and the effects of such foreign teas.

ESSAY ON TEAS.

NATURE.

HERE is, perhaps, no subject on which there has been more declamation, for and against its properties and effects, than those of teas imported into this country by the companies trading from the different maritime nations of Europe to China and India. Nor has there been a controversy in which the health of the community has been so materially concerned, that has afforded so little direction of moment to those who would wish to ascertain the truth of such teas being either beneficial, injurious, or innocent in their effects. Amidst a mass of declamatory assertion so little intelligence is to be gained, that those who have had the greatest interest in being informed of the real qualities of teas, have mostly abandoned the enquiry before they obtained the least knowledge of what they sought. Either perplexed with abstruse science or dissatisfied with assertion equally unfounded and unsupported, thousands have discontinued the research, and committed themselves to fatal experience. Thus have too many acquired a knowledge of the detrimental qualities of teas, by the ruin of their constitution. To avoid, therefore, such an inconvenience, the greatest care will be taken to prevent an indiscriminate reference to authors whose sentiments can neither sanction adduced arguments or illustrate technical allusions. The enquiry will be made with some reference to science,

ence, but more to convince by demonstration than to confound by abstruse perplexities. So that, while empty declamation is avoided, the principles of truth are meant to be investigated by reason and experience. With this view, the

NATURE

of green, souchong and bohea teas, are first considered. To judge of the nature of these herbs with equal candour and propriety, it may be necessary to consider their qualities in relation to what are ascribed them, what have been discovered by their analysis, and what have resulted from experience. The virtues that have been ascribed to them are chiefly, being a grateful diluent in health, and salutary in sickness, by attenuating viscid juices, promoting natural excretions, exciting appetite, and proving particularly serviceable in fevers, immoderate sleepiness, and head-achs, after a debauch. It is also added to the list of their ascribed virtues, that there is no plant yet known, the infusions of which pass more freely from the body, or more speedily excite the spirits. To a person of any physical knowledge, these qualities will either appear contradictory in themselves, or rather ultimately injurious, than absolutely beneficial. As the full examination of these assumed qualities, by the rules of science, would require a volume, instead of a few pages, which the limits of this Essay will afford; the enquiry must be made as perspicuous as the necessity of brevity will admit. Allowing they are diluting in health, their constant use may so attenuate the liquids as to destroy their natural force and tensity. But Boerhaave says, there is no proper diluent but water. It is, therefore, evident it is the water, and not the tea, which is the diluting medium. With respect to its being an attenuative of viscid humours, it can never possess this virtue from being a diluent, for an attenuant acts *specially* on the particles, by diminishing

ing their bulk while the diluent acts upon the whole mass of the fluid.

The general body of the liquid may be diluted while the viscid humours remain unresolved. Indeed the operation of an attenuant is not easily known; for many are surprised that a slight inflammation should be so difficult to dissipate. But their surprise would cease were they to consider, that medicines act more generally upon the whole body than abstractedly upon the part affected. Suppose to attenuate some coagulated blood, six grains of volatile salt were given, how small a proportion must come to the part diseased, when these few grains, by the laws of circulation, will mix with the entire mass of blood, consisting at least of thirty pounds!

Teas being said to promote natural excretions, can be no recommendation of what is so generally used; for this constant effect must render them too copious, and thus, according to all physical experience, the blood must be thickened in the greater vessels, which frequently terminates in an atrophy.

The appetite being excited by the drinking of tea is more a proof of its attrition of the solids than any stimulus to a wholesome desire of food. This quality accounts for the acrimonious effects too many have experienced by its use. Many have not only had their blood impoverished, but corrupted by the constant drinking of these teas. Whether it arises from any positive acrimonious salt it naturally possesses, or from any acquired corrosiveness from its mode of drying, is not here necessary to enquire: it is only requisite to state that a pernicious effect is too fatally experienced by those who are unfortunately its slaves.

How India tea can be serviceable in fevers is not easy to be understood; for, if it has that effect upon the nerves to excite watchfulness, it must greatly tend to increase, instead of diminish, feverish symptoms. Dr. Buchan attributes even one cause of the palsy to drinking

drinking much tea or coffee, &c. and, in a note, he subjoins : " Many people imagine that tea has no tendency to hurt the nerves, and that drinking the same quantity of warm water would be equally pernicious. This, however, seems to be a mistake. Many persons drinking three or four cups of warm milk and water daily, without feeling any bad consequences ; yet, the same quantity of tea will make their hands shake for twenty-four hours. That tea affects the nerves is likewise evident from its preventing sleep, occasioning giddiness, dimness of the sight, sickness, &c."

With regard to India teas possessing the quality of exciting the spirits, this, like every other stimulus, either by constant use loses its effect, or unnerves the system it is meant to strengthen. The nerves through which the animal spirits circulate, being like the strings of a violin or harpsichord, too frequently braced, lose, at last, their natural tensity, and thus, render the human frame one system of debility.

Having thus, as briefly as possible, stated that even their ascribed virtues are either derogatory to all physical principle, or else destructive to the constitution, from their constant use; the nature of India teas is next considered, with respect to what appears to be their chief component parts, from analization.

Teas have been found to consist principally of narcotic salts, some astringent oil, and earth. These being found in greater quantities in bohea than in green teas, those who have very sensible and elastic nerves, must be seized with a greater tremor after drinking the former than the latter. The continual and regular influx of the nervous juices is stopped by their component fibres being contracted from the roughness and restringency of such decoctions. The force of the heat, or the brain's propulsion of its nervous juice, being inferior to the resistance of the whole ramified fibres thus increased by the sudden contraction and unequal

unequal motion, the flow of the animal spirits must be greatly impeded and disordered. In fact, the influx suffers a suspension until the fibres, by relaxing again, admit their empty tubes to receive their appropriated liquids. Thus even green tea must, especially if taken strong and often, stop the natural circulation of humours, and produce the attendant defects of depression of spirits, deficiency of secretion, loss of appetite, decrease of strength, waste of body, and, finally, a total want of effective vigour in all the animal functions. But, as above observed, bohea tea possessing in greater quantity the pernicious ingredients, the vessels are thrown into momentary spasms and convulsive vibrations, by the relaxing power of the narcotic salts, and the contracting force of the astringent oil and earth. And here, it must be noticed, that oil, mixed with salt, is rendered astringent: thus all vegetables, where a mixture of both prevails, are reckoned stimulating. The narcotic power of the salt is derived from its hindering the flux of the animal spirits through the nerves.

The stomach and bowels being weakened by the above causes, windy complaints, or flatulencies, are consequently produced. This caused Dr. Whytt, in his advice to patients afflicted with such diseases, to desire they would abstain from India tea, as one of the flatulent aliments chiefly to be avoided.

If the slightest external motion alone produces the following changes in the body, what effects may not be ascribed to the constant use of teas, which we find, as before stated, operate internally? A person in perfect health, having his nostrils only touched with a feather, cannot avoid his body being so convulsed, as to produce what is commonly called sneezing. But if the number of muscles agitated, the force and straining of the body by sneezing are considered, the slightness of the cause must excite no little astonishment; for this action is occasioned by the muscles of

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the scapula, abdomen, diaphragm, thorax, lungs, &c. and if the sneezing continues, an universal explosion of the liquids ensues: tears, mucus, saliva, and urine, are excreted. Thus without any moist, cold, hot, dry sulphur, salt, or any other internal or external application, an involuntary motion of all the solids and fluids is produced by a feather touching, in the slightest manner, the inside of our nostrils. But Boerhaave relates further, "That if sneezing continues a long time, as it will by taking one hundredth part of a grain of euphorbium up the nose, grievous and continued convulsions will arise, head-achs, involuntary excretions of urine, &c. vomitings, febrile heats, and other dreadful symptoms; and, at last, death itself will ensue." It is therefore evident that the slightest bodies produce the greatest changes in the human frame.

Such is the power of certain particles upon the nerves, that the stomach will be thrown into convulsions that almost threaten an inversion, by taking only four ounces of a wine in which so small a portion of glass of antimony, as one scruple is infused in eight pounds of the former. And what is still more remarkable is, that the glass of antimony remains not only undissolved, but, comparatively speaking, undiminished in its weight.

These being a few of the fatal afflictions which experience shews to be frequently the consequence of drinking India teas, its injurious nature is too evident to require any further investigation of either their ascribed or positive qualities. The next subject to be considered, relative to India teas, is their

PREPARATION.

Among the different Authors of any consequence that have written on the culture, preparation, and virtues of foreign teas, may be ranked Kampfer, Postlethwaite, Dr. Cunningham, Priestly, Lemery, Franckus,

chus, Meister, and Sigesbeck ; as the limits of this Treatise will not permit a detail of observations from the whole of these writers, remarks can only be selected from the most principal of them. Most of the above, and many other Authors, agree that the leaves are spread upon iron plates, and thus dried with several little furnaces contained in one room. This mode of preparation must greatly tend to deprive the shrub of its native juices, and to contract a rust from the iron on which it is dried. This may be probably the cause of vitriol turning tea into an inky blackness. We, therefore, do not think with Boerhaave, that the preparers employ green vitriol for improving the colour of the finer green teas. It may, however, be concluded, from the colour of bohea, souchong, and such as are called black teas, that they may be thus tinctured, by the means of vitriol, after they have been dried upon the iron plates in the furnace room. And this may, likewise, particularly cause that astringent quality which is more experienced in all the black than any of the green teas. According to Sigesbeck, the colours of these teas are artificial ; so that if these pernicious arts are used even to give the tea a particular colour, there is no difficulty in ascribing the cause of their injurious effects.

That the native virtues of these teas are liable to considerable perversion, is evident from the manner in which Meister relates that they are prepared. He says the leaves are put into a hot kettle, just emptied of boiling water ; and that they are kept in this closely covered until they are cold, when they are strewed upon the hot plates above-mentioned for drying. It is easy to conceive how the virtues of a leaf, however salutary by nature, must be destroyed by such a process. Being thus put into a steaming kettle, and suffered to remain there until they are cold, must cause the greater part of their virtues to evaporate, and the leaves to imbibe an unwholesome taint from the

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fluvia of the steaming metal.^{heat} It cannot, therefore, be ascertained whether teas that are imported in Europe, after such a mutating preparation, have the least remains of their original odour or flavour, no more than they have of their qualities. But, on the contrary, it seems impossible but that the original nature of this shrub is entirely destroyed by an artificial preparation. Some falsely suppose that this species of management is only to soften such of the leaves as are grown too dry, and are therefore liable to break in the curling. But this will evidently appear not the cause, when it is considered that the greater part of the teas must dry in such a hot climate while they are gathering. And as they are particularly anxious to send them in as curious a curled state as possible, such teas must be thus moistened again, in order to curl them afterwards in that perfect manner which is performed on the iron plates of the furnaces.

The opinion, therefore, of teas deriving their green colour from being dried upon copper being founded on a misrepresentation of the manner in which they are really prepared, a few observations upon the subject are indispensably necessary. For those who have always understood that the detrimental qualities of foreign teas were the consequence of their being dried upon copper, may, perhaps, imagine they cannot be so pernicious if they were dried upon iron; but this opinion cannot be entertained by any persons who have the least knowledge of the manner in which the vegetable acid will corrode iron. Those who are acquainted with culinary processes, must know in what manner the acid of onions will operate upon any steel instrument; it corrodes a knife so as to turn the onions black, with the particles eaten away from the edge and surface of the blade. To avoid this unwholesome and unseemly inconvenience, a wooden instrument is generally used in all instances where onions form a part of the cookery appendages. It is consequently evi-

dent, that although iron utensils are now greatly used instead of copper, yet many injurious effects may happen from their being liable to be corroded by the acid of several vegetables. And if the nitrous acid of the air will corrode iron so as to cause rust, when it will not produce the proportionate effect upon copper, it is a demonstration that iron is the most liable to such a corruption. The corrosions of copper are undoubtedly pernicious; but the damage that tea would derive from its being dried upon sheets of this metal would not operate so injuriously to those who drink it as it does now by lying dried upon iron. For the latter being more liable to the power of the mineral, vegetable, or animal acid, must impart more particles of its reduced calx to the tea than copper would. And, in order to shew how susceptible of corrosion iron is, the following instance is farther adduced: in Ireland, where some persons practise the art of tanning leather with fern, which possesses a very strong acid, particular care is taken to avoid using any iron vessels in the tannage, lest the colour of the leather should be blackened by the corroding particles of the metal. As it is the peculiar property of iron or steely particles, even in their most perfect state, to operate as too great an astringent for an aliment that is taken twice a day constantly, tea, when dried upon it, must be rendered proportionably pernicious. But admitting that the popular opinion of their being dried upon copper was just, the teas must be rendered proportionably injurious to the quantity of copperas or crude vitriol they imbibe from their acidity corroding the metal. Preparations of steel, that are, in many instances, considered as most salutary, yet in all pulmonary disorders the most eminent physicians have deemed them exceedingly dangerous. And in a country, like Great Britain, Holland, and other places, where a cloudy atmosphere, caused from their marshy soil or watery situation, renders most of the inhabitants subject to complain-

plaints of the lungs, foreign teas, contaminated by these iron corrossions, must be particularly detrimental. It is therefore, from these considerations, evident, that foreign teas, by being dried upon iron, have their bad qualities so encreased as to render them the most pernicious of any morning and evening liquid that has yet been taken. To return from whence we began this short digression.

It is remarkable that no satisfactory account has yet been given in what the bohea differs from the green tea. Dr. Cunningham, physician to the English settlement at Chusān, and Kampfer assert, that the bohea is the leaves of the first collection.

This, however, being contrary to the general report of all travellers, that none of the first produce is brought to Europe, must be discredited; for these are all reserved for the Princes, to whom they are sold, even in China, at an immense price. Another proof is, that the boheas are brought here in the most considerable quantities, at a price greatly inferior to what even the second, third, and fourth crops are sold for in China. This not only evinces how inferior in quality the black tea must be, but also how little they are valued among those who must be acquainted with their properties.

Although the European dealers divide the green teas chiefly into three sorts, and the bohea into five; yet it is unknown from what province they are brought, of what crop they are the produce, and to which of the Chinese sorts they belong.

Added to their abuse of preparation may be that of their package. It is impossible but to know that their bad qualities must be considerably augmented by being so closely packed, for such a length of time, in such slight wooden chests, lined with a composition of wood and lead. Considerable quantities are likewise damaged by salt water and other causes, which, by the management of the tea dealers, are mostly

mixed and sold under different denominations. How the tea must be affected by the corrosion of the lead and tin by the marine acid, those of the least chemical knowledge will easily determine. To what danger must, therefore, the constitution of those who are in the constant habit of drinking such an empoisoned drug be exposed, may easily be imagined. Surely, when all these circumstances are considered respecting the pernicious mode of preparation, and particularly the poisonous qualities they are also liable to contract from the nature of their package, every person must be convinced to what a loss of health, if not of life, the constant use of such teas must expose them. Such evidence of their deleterious tendency is almost sufficient to alarm mankind against so prevailing an evil, without any further arguments; but as health is too precious not to require every possible proof that can persuade us to avoid what so immediately threatens our existence, the following arguments and testimonies of the bad qualities of foreign teas must not be omitted. Previous, however, to an investigation of their effects, it may be necessary to say a few words respecting the

MANNER OF USING

foreign teas, as before observed, being taken as two principal meals of our daily aliment, is undoubtedly one great reason of the constitution of the people having suffered an entire change in its system: That vigour, spirits, and longevity, which characterised us in the last century, is totally subverted; disease, dismay, and debility, now leads us prematurely to the grave, where we end an existence too deplorable to excite the least desire for a longer continuance. Dr. Priestly states, very justly, in his Medical Essays, that it is curious to observe the revolution which hath taken place; within this century, in the constitutions of the inhabitants of Europe. Inflammatory diseases

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more rarely occur, and, in general, are much less rapid and violent in their progress than formerly; nor do they admit of the same antiphlogistic method of cure which was practised with success a hundred years ago. The experienced Sydenham makes forty ounces of blood the mean quantity to be drawn in the acute rheumatism; whereas this disease, as it now appears in the London hospitals, will not bear above half that evacuation. Vernal intermittents are frequently cured by a vomit and the bark, without venæfction, which is a proof that, at present, they are accompanied with fewer symptoms of inflammation than they were wont to be. This advantageous change, however, is more than counterbalanced by the introduction of a numerous class of nervous aliments, in a greater measure, unknown to our ancestors, but which now prevail universally, and are complicated with almost every other distemper. The bodies of men are enfeebled and enervated, and it is not common to observe very high degrees of irritability under the external appearance of great strength and robustness. The hypochondriac, palsies, cachexies, drop-sies, and all those diseases which arise from laxity and debility, are, in our days, endemic every where; and the hysterics, which used to be peculiar to the women, as the name itself indicates, now attacks both sexes indiscriminately. It is evident that so great a revolution could not be effected without the concurrence of many causes; but amongst these, I apprehend, the present general use of tea holds the first and principal rank. The second cause may perhaps be allotted to excess in spirituous liquors. This pernicious custom owes its rise to the former, which, by the lowness and depression of spirits it occasions, renders it almost necessary to have recourse to what is cordial and exhilarating; and hence proceeds those odious and disgraceful habits of intemperance with which too many of the softer sex of every degree are now, alas!

chargeable. These are the sentiments of a character distinguished for his elaborate researches and judicious discoveries in almost every branch of liberal science. It may therefore be safely concluded, that the general manner of using India tea, morning and evening, has been, and is the principal cause of the greater part of the diseases with which the natives of Europe are now afflicted. When it is considered that the first meal which is taken to recruit the body, after the loss it sustains from the insensible perspiration of the preceding night, and to prepare it for the avocations of the succeeding day, is India tea, who can be surprised that nature should rapidly become the victim of disease? Thus, instead of being supported by nutritious aliment, its nerves are enfeebled, its spirits diminished, and all its functions enveloped with the gloom of melancholy. Even in the afternoon, when nature is exhausted by care and fatigue, we fly for refreshment to tea, which, instead of bracing, still further relaxes the unnerved system. Such are the evil effects of the imprudent manner in which this pernicious drug is so constantly and universally used. But how must these evils appear in their extent, when the following view is taken of India teas, with regard to their variety of injurious

EFFECTS.

In all the physical experiments that have been made upon India teas, there is, perhaps, none that shews its acid astringency more than one tried by the above writer, Dr. Priestley. Endeavouring to trace the difference and ascertain the astringency and bitterness of vegetables reciprocally bear to each other, he imagined he had found they were distinct and separate properties, by the following experiment: Taking two pieces of calf-skin just stripped from the calf, he immersed them in cold infusions of green and bohea tea; at the expiration of a week he found they were hard and

and curled up, and that there was no sensible difference between them. He therefore concluded, that this experiment afforded a striking proof of India tea differently affecting a dead and a living fibre ; this he considered as the greatest effect of a medicine. But with deference to so distinguished an author, I cannot but attribute this astringency of the skin to the particular properties of India tea ; for all physical as well as medical experience proves that vegetable produce afford some that are astringent, and others that are relaxant, of the dead as well as the living fibre.

Oak bark is equally astringent, and hardens the fibres of the hide, as well as it braces the living nerve of our bodies ; therefore the effect produced by the India tea upon the dead skin only proves what we have before related, that an infusion of it has a peculiar effect, which, being too frequently applied to the nerves, destroys their tensity by their fine fibres being either broken or relaxed by overbracing. Were any astringent to be constantly taken, it must ultimately produce more or less such an effect ; so that while the above experiment of the learned Philosopher demonstrates that India tea has the power of astringing the dead as well as the living fibres, it does not prove that astringency and bitterness are separate qualities. On the contrary, bitterness seems to be the characteristic taste of all that has the tendency to contract whatever is the subject of its application. Thus galls, bark, rhubarb, camomile tea, &c. &c. are all bitter and astringent. It is, therefore, the immoderate use of such an astringent that ultimately relaxes and debilitates ; like the too frequent bracing of a drum, or any other stringed musical instrument, destroys its tensity, the body is unnerved by the overstretching of its fibres. Although we sometimes differ with the celebrated Doctor in part of the conclusion he has drawn from his experiment, yet the following sentiments so perfectly coincide with all our observations upon India teas,

teas, that we are happy to have the opportunity of corroborating our own with the sentiments of so eminent a Philosopher. He says, from his experiments, " It appears that green and bohea teas are equally bitter, strike precisely the same black tinge with green vitriol, and are alike astringent on the simple fibre. From this exact similiarity in so many circumstances, one should be led to suppose that there would be no sensible diversity in their operation on the living body; but the fact is otherwise; green tea is much more sedative and relaxant than bohea; and the finer the species of tea, the more debilitating and pernicious are its effects, as I have frequently observed in others, and experienced in myself. This seems to be a proof that the mischiefs ascribed to this oriental vegetable do not arise from the warm vehicle by which it is conveyed into the stomach, but chiefly from its own peculiar qualities." Dr. Hugh Smith, in his Treatise on the Action of the Muscles, justly says, than an infusion of India tea not only diminishes but destroys the bodily functions. *Thea infusum, nervo muscolore ranæ admotum, vires motrices minuit perdit.* Newman, in his Chemistry, says, when fresh gathered, teas are said to be narcotic, and to disorder the senses; the Chinese, therefore, cautiously abstain from their use until they have been kept twelve months. The reason attributed for bohea tea being less injurious than green, is being more hastily dried, the pernicious qualities more copiously evaporate.

" Tea," says Dr. Hugh Smith, in his Dissertation upon the Nerves, " is very hurtful both to the stomach and nerves. Phrenesies, deliriums, vigilation, idiotism, apoplexies, and other disorders of the brain, are all produced by the nerves being thus disarranged and debilitated. If the digestive faculty of the stomach be weakened, the body, failing of recruiting juices, must tend to emaciation, and the

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“ whole frame be rendered one system of distress and infirmity. The nerves being thus deprived of a sufficiency of their animal spirits, must become languid, and leave every sense void of the first means of conveying to the mind the only enjoyments of our temporal existence.

“ But if there be any class of persons to whom India tea is more particularly hurtful than to any other, it is that which includes the studious and sedentary, and especially those who are enfeebled with gout, stone, and rheumatism; age, accident, or avocation, cause many persons to be unfortunately ranked amongst those of the latter description. These, from their intensity of thought, want of exercise, injurious position of body, respiration of unwholesome air, and a variety of other causes, have not only their animal spirits exhausted, but their liquids corrupted from the loss of a necessary circulation. With these evils India tea operates as an absolute poison. Indeed, it frequently renders those incurable, who might, by other means, have been relieved.

“ When a view is taken of the dismal effects produced by India teas, the mind seems to be bewildered in searching for the cause of using so generally a drug that is so universally destructive. It chiefly originated in a fundamental mistake of physical principles. About the time that India tea was introduced to Europe, a grievous error crept into the practice of medical professors; they falsely imagined that health could not be more promoted than by increasing the fluidity of the blood. This opinion once established, it is no wonder that mankind, with one accord, adopted the infusion of India tea, which was then a novelty to Europe, as the best means of obtaining the above effect. By the advice of Bentikoe chiefly was the pernicious custom of drinking warm liquors night and day established.

blished. To this man, and the introduction of India tea, may be ascribed that revolution in the health of Europeans which has happened since the last century. The present age, therefore, have great cause to lament, in what they suffer in nervous complaints, that their forefathers did not attend more to the scientific and judicious advice of the illustrious Duncan, Boerhaave, and the whole school of Leyden, who proscribed this error. Although they could not entirely prevent this physical abuse, yet their zealous endeavours did, in some degree, at first impede its progress ; but, however, so powerful did novelty plead in favour of India teas, that, at last, general custom and prejudice bore away every barrier that had been erected by these learned and experienced physicians. This terror, instead of diminishing, has increased ; most valetudinarians are now of opinion, that a thick blood is the sole cause of their complaints. With this impression, they adopt what they call the diluent beverage of India teas. It can scarcely be imagined how many disorders this practice produces ; it may be justly termed the box of Pandora, without even hope remaining at the bottom." Tiffot says, "They are the prolific sources of hypochondriac melancholy, which both adds strength to and is one of the worst of disorders." He adds, "with regard to studious men, who are naturally weak and feeble, such warm beverages are more hurtful to them than to others ; for they are not troubled with an over thick, but, on the contrary, too thin a blood. You are all aware," continues he, "respectable auditors, that the density of the blood is as the motion of the solids ; the fibres of the learned are relaxed, their motions are slow, and their blood, of consequence, thin. Bleed a ploughman and a doctor at the same time ; from the first there will flow a thick blood, resembling inflammatory blood, almost solid, and

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“ of a deep red ; the blood of the latter will be either
 “ of a faint red, or without any colour, soft, gelati-
 “ nous, and will almost entirely turn them to water.
 “ Your blood, therefore, men of learning, should
 “ not be dissolved, but brought to a consistence ; and
 “ you should in general be moderate in the article of
 “ drinking, and cautiously avoid warm spirituous li-
 “ quors.

“ Amongst the favourite beverages of the learned,”
 the same Tissot observes, “ is the infusion of that fa-
 “ mous leaf, so well known by the name of Indian
 “ tea, which, to our great detriment, has every year,
 “ for these two centuries past, been constantly im-
 “ ported from China and Japan. This most pernici-
 “ ous gift first destroys the strength of the stomach,
 “ and if it be not soon laid aside, equally destroys
 “ that of the viscera, the blood, the nerves, and of
 “ the whole body ; so that malignant and all chronic
 “ disorders will appear to increase, especially nervous
 “ disorders, in proportion as the use of Indian tea
 “ becomes common ; and you may easily form a judg-
 “ ment from the diseases that prevail in every coun-
 “ try, whether the inhabitants are lovers of tea or
 “ the contrary. How happy would it be for Europe,
 “ if, by unanimous consent, the importation of this
 “ infamous leaf were prohibited, which is endued
 “ only with a corrosive force, derived from the acri-
 “ mony of a gum with which it is pregnant.”

Having thus considered the dismal and too frequently fatal consequences of the nerves being affected, it is presumed this part of the Essay cannot be more interestingly concluded than by a summary of the distinct symptomatic effects attending, more or less, complaints of the nerves ; and although the following symptoms are alarming with regard to their number and variety, yet the reader may be assured there is not one specified but what is either the immediate or ultimate effect of a nervous affection, and which

which is too frequently the consequence of the violent astringency of foreign tea taken injudiciously as a constant aliment.—A faintness, succeeded with a delusive vision of motes, mists, and clouds falling backwards and forwards before the distempered sight—A yawning, gaping, stretching out of the arms, twitching of the nerves, sneezing, drowsiness, and contraction of the breast—Dulness, debility, distress, and dismay, with a great sense of weariness—A wan complexion, a languid eye, a loathing stomach, and an uncertain appetite, which, if not immediately satisfied, is irretrievably lost—Heart burning, bilious vomitings, belchings, pains in the pit of the stomach, and shortness of breath—Dizziness, inveterate pains in the temples and other parts of the head, a tingling noise in the ear, a throbbing of the brain, especially of the temporal arteries—Symptoms of asthma, tickling coughs, visible inflations and unusual scents, affecting the olfactory nerves—Sometimes costive and sometimes relaxed—Sudden flushings of heat and suffusions of countenance—In the night, alternate sweats and shiverings, especially down the back, which seems to feel as if water was poured down that part of the body—A pytalism or discharge of phlegm from the glands of the throat, which generally attends all the symptoms—Troublesome pains between the shoulders, pains attended with hot sensations, cramps and convulsive motions of the muscles or a few of their fibres—Sudden startings of the tendons of the legs and arms—Copious and frequent discharges of pale and limpid urine—Vertigoes, long faintings, and cold, moist clammy sweat about the temples and forehead—Wandering pains in the sides, back, knees, ankles, arms, wrists, and somewhat resembling rheumatic pains—The head generally warm while the rest of the body is cold or chilly—Obstinate watchings, disturbed sleep, frightful dreams, the nightmare, startings when awake, and the mind filled with the most terrific apprehensions—Tremors of the limbs

and

and palpitations of the heart—A very variable and irregular pulse—Periodical pains in the head—A sense of suffocation, frequent sighings, and shedding of tears—Convulsive spasms of the muscles, tendons, nerves of the back, loins, arms, hands, and a general convulsion of the stomach, bowels, throat, legs, and, indeed, almost every other part of the body—A quick apprehension, forgetful, unsettled, and constant to nothing but inconstancy—A wandering and delirious imagination, groundless fears, and an exquisite sense of his sufferings—A gradually sinking into a nervous atrophy or consumption—A perpetual alarm of approaching death—Sometimes cheerful, and sometimes melancholy—Without present enjoyment or future expectation of any thing else but increasing misery and debility—if these symptoms are inconsiderately suffered to continue, they soon terminate in palsy, hip, madness, epilepsy, apoplexy, or in some mortal disease, as the black jaundice, dropsy, consumption, &c.

Having ascertained, from this inquiry, the injurious properties of India tea, it may naturally be expected that I should propose some article that might prove more beneficial. With this requisition I shall most ready comply, although I may expose myself to the invidious censure of having directed all my efforts to establish the celebrity of whatever article I may recommend. But being convinced that, by publishing the virtue of a tea that I have investigated from physical analysis and particular observation, I may essentially serve the public, I am content to suffer the obloquy, provided it is productive of a general benefit. Having, as before observed, examined, with the greatest attention, the nature of most articles that have been offered as morning and afternoon beverage, there are two which claim most particularly the preference of all others that are sold under the denomination of tea. These are, 1st, that which was discovered by that eminent botanist, Sir Hans Sloane; and the other

other, by a botanist and physician equally celebrated, Dr. Solander. I therefore, without considering in what manner the interest of the proprietors of these teas may be individually affected, propose two articles, in order to shew my partiality or opinion of the virtues of the one could not prejudice me so far as to prevent my allowing due praise to any other possessing qualities deserving approbation. I am happy to state that, from my analysis of that invented by Sir Hans Sloane, called British tea, I found it possess most singular virtues for relieving many nervous complaints. But, from the same trials and experiments made on that invented by Dr. Solander, I have been convinced that, although the qualities of the former are exceeding salutary, they are not so general in their restoration and nutritious effects as the latter. Being thus convinced of the extraordinary properties of Dr. Solander's tea, I have been induced to state, in a Treatise upon their nature, preparation, and effects, reasons founded on chemical analysis, physical efficiency, and experimental observation, in support of their most eminent virtues. After every trial I have made of coffee, chocolate,* and most other preparations;

* " Coffee—In bilious habits it is very hurtful."

Dr. Carr's Medical Epistles, page 25.

" Coffee—I cannot advise it to those of hardness of breathing."

Ibid. page 29.

" Coffee—according to Paule, a Danish Physician, enervates men, and renders them incapable of generation, which injurious tendency is certainly attributed to it by the Turks. From its immoderate use, they account for the decrease of population in their provinces that were so numerously peopled before this berry was introduced among them. Mr. Boyle mentions an instance of a person to whom coffee always proved an emetic. He also says that he has known great drinking of it produce the palsy.

" Chocolate is too gross for many weak stomachs, and exceedingly injurious to those liable to phlegm and viscid humours."

Saunders's Natural and Artificial Directions for Health.

" Chocolate overloads the stomach, and renders the juices too slow in their circulation."

Smith on the Nerves.

tions that have been, and are at present offered to the public as a substitute for tea, none seem to claim the preference so eminently as that invented by Dr. Sölander. From their analysis, I find their virtues are of the most corrective and balsamic kind; they strengthen the tone of the stomach, not by astringing the solids, but by lubricating the vessels, sheathing the acrids, and attenuating the liquids.

In this manner they restore the equilibrium of the oscillatory motions which establish the tone of the nervous system. This being strengthened, the animal spirits are enabled to dispense their reviving influence to the sensitive, digestive, and intellectual powers. And these being thus restored to their vigour of operation, a simple and moderate portion of food is rendered the most nutritious, and the body is consequently established in the enjoyment of health and happiness.

The above virtues of the sanative tea are not here asserted as a declamatory panegyric, but as the result of a physical analysis of their nature, and a serious examination into their mode of operating as a restorative and a constant aliment. Without presuming their qualities to be an unlimited remedy for all complaints, the nature of the preparation of this tea is compared with the causes and effects of nervous disorders: from this comparison their relative virtue to such diseases are most clearly evinced: and thus is this invaluable discovery proved to be the most effectual remedy for all those complaints, caused by drinking foreign teas, that was ever yet or may be hereafter invented.

In proposing to the Public any Simple or Compound, for the preserving, increasing, or restoring health, the first object should be to explain its nature. This is the principal test by which its merits can be known, or mankind rationally induced to try its virtues. And as this sanative tea is offered as a substitute for what is generally used as two fourths of our aliment,

aliment, and which, from the preceding inquiry, has been found the principal cause of our present infirmities, the greater necessity there is for a candid investigation of its nature.

Impressed with the above conviction, it is fairly stated that the nature of this fanative tea is not from any combination of the animal or mineral kingdom, but a collection of the most salutary native and exotic herbs that are produced in the vegetable empire of nature. These have not been collected by the fanatic devotees of occult qualities, but by the scientific researches and personal experience of a character that is equally and justly admired for his philosophical, medical, and botanical knowledge. The discoverer, Dr. Solander, of this tea, inquired into the virtues of each native and exotic herb of which it is composed, not only by abstract reasoning upon its relative qualities, but by the more immediate evidence of his senses: by submitting each vegetable to his taste and smell, he derived the most certain physical proof of its qualities. Thus he knew the particular virtues of each, and what salutary effects they must, from their preparation as a compound, produce when applied as a relief for the innumerable diseases caused by drinking foreign teas. Not confining himself to *English Plants*, he studied and examined the virtues of *exotics*, among which he discovered some that possess virtues he had not found in those of his own country: by adopting these, he has increased the salutary effects of his invaluable tea. From reading Hippocrates, Dioscorides, and Galen, he found the ancients derived all their knowledge of plants by their taste and smell. With these examples before him, and his own propensity to the study, joined to his penetrating judgement, it is no wonder he should have so well succeeded. Thus he recurred to the original mode of inquiry, which first established and raised the eminence of physic; neglecting that delusive principle of Aristotle's

stotle's philosophy, which has since taught too many physicians to express the virtues of medicines by hot, cold, moist, and dry, without deriving the least information from their senses, Dr. Solander, aided by chemical analysis, distinguished the virtue by the taste or odour of every plant. By this means their specific juices he found tasted either earthy, mucilaginous, sweet, bitter, aromatic, fetid, acrid, or corrosive. From this experience he found the observation of some botanists to be true, "That there is no virtue yet known in plants but what depends on the taste and smell, and may be known by them *". With this infallible means of pursuing his inquiry, he formed a tea composed of herbs that are in their nature astringent, balsamic, aromatic, cephalic, and diaphoretic. These virtues combined may be said to form one of the most incomparable specifics, as a nutritive and restoring aliment, that has been discovered.

In the astringent, the acid fixing upon the more earthy parts, the nutritious oil is more easily separated, which renders them also pectoral, cleansing, and diuretic. This part of the tea is in its nature particularly serviceable in all cases where vulnerary medicines are requisite. They particularly amend the acid in the nervous juice, and thus restore the equal motion of the spirits, which were obstructed or retarded by spasms or convulsions. By the volatile oil and volatile pungent salt, obstructions are opened, and the motions of the languid blood increased to a healthy degree of circulation. They resolve coagulated phlegm in the stomach, preserve the fluidity of the juices, and promote digestion, by assisting the bile in its operation.

And with regard to their balsamic and aromatic nature, these qualities warm the stomach and expel wind, by rarefying the flatuous exhalations from the

E chyle

* Floyer, Malpighius, Epew, Harvey, Willis, Lower, Needham, Glisson, &c.

chyle in the *prima viæ*. These, by their sweetness, allay the sharpness of rheums, and lenify their acrimony. Being filled with an oily salt, they open the passages of the lungs and kidneys. By opening the pores, they extraordinarily discuss outward tumours, and attenuate the internal coagulation. All these virtues may be said to be derived from the union of their balsamic oil and volatile salt.

By a second class of aromatics, with which Dr. Sölander composed this sanative tea, is such as have a bitter astringency joined to their volatile oil and salt. These united qualities correct acids in the stomach, cleanse the lungs, and open obstructions in the glands caused by coagulated serum; and the saline pungent oil altering the acids in the glands of the brain, by correcting and attenuating its *lympha* and *fuccus nervosus*, produces the same effect; for the *lympha* and nervous juice are, like all other glandulous humours, liable to acidity and stagnation; therefore these aromatics, by exciting their motion and correcting their acidities, render the liquids of the nerves more volatile, and are therefore justly termed *cephalics*. And as it is the property of volatiles to ascend, the reason is evident of the brain being assisted by their salutary qualities. These aromatics likewise evacuate serum from the blood, promote its circulation, and attenuate the coagulations of chyle, *lympha*, and *fuccus nervosus*. And here it is proper to add, that all aromatics, by rarefying the blood, are cordial. There being aromatic astringents in this tea, its infusion strengthens the fibres and membranes of the stomach, and all the nervous system, in such a manner as not to destroy their tensity by that too great contraction caused by the foreign teas; and, having no acid in their astringency, the blood is preserved from too great a rarefaction, which would otherwise happen from the pungency of their oily qualities. These also excite the appetite, by stimulating the natural pro-
gress.

gress of the chyle, and thus prevent its too rapid fermentation of its spirituous parts into windy flatulencies. For the same reason vinegar is taken with hot meats and herbs. Having mentioned vinegar, it may not be improper to state this vegetable acid is the best antidote against the poison of any acrid herbs. That part of the tea which has a mucilaginous taste is inwardly cooler than oil, although it be different in nature. Such herbs defend the throat from the sharpness of rheums, the stomach from corrosive humours of disease or acrimonious medicines, the ureters from sharp, choleric, or acid urine, and lubricate the passages for the stony gravel. Their crude parts cool the heat of scorbutic blood, lessen its violent motion, and sheathe its acrid saline particles.

By their different mucilaginous principles, they produce the following various salutary effects :

The earthy repel and cool outward inflammations.

The watery, which is thick and gummoſe, stop fluxes and correct sharp humours.

Those of an oily odour alleviate pains.

Those of a pungent acrid dissolve tartareous concretions in the kidneys.

From these and a variety of other salutary properties, it is evident the general nature of Dr. Solander's tea is such as to correct acrid humours, promote the secretions, restore the equilibrium between the fluids and solids, and finally to brace every part of the relaxed nervous system. The body being thus relieved from obstructions, its circulations restored, the digestive faculties invigorated, and the spirits reanimated, the debilitated constitution is reinstated in all its enjoyments of health and hilarity. It may be therefore observed, that the principle of this tea is to nourish as a general aliment, while it renovates the human constitution, without having recourse to the nauseous potions of galenical preparation, or the hazardous trial of chalybeate waters. As this tea is particularly

salutary in all cases where mineral waters are generally recommended, it is very proper the Public should be cautioned against the danger which too frequently attends the constant drinking of them.

Chalybeate waters, it must be acknowledged, have effected very extraordinary cures in certain cases. But when so great an author as Helmont says, that such waters are fatal to all those who are afflicted with peri-pneumonic complaints, it is surely necessary they should be resorted to with the greatest caution; and even in complaints where they may be serviceable, it is necessary to observe whether they really possess those chalybeate qualities for which they are commended. Those who have written upon their virtues assert, and with seeming propriety, that where they deposit an ochreous sediment, they are certainly dispossessed of their steely virtues; for ochre being no other than the calx of iron, such a residue evinces the evaporation of the more eminent properties of the chalybeate, by the phlogiston of the mineral escaping by its extreme volatility. Every metal deprived of this igneous principle is immediately reduced to a calx, and thus deprived of its splendour, fusibility, and other properties, until restored again by the re-admission of its phlogiston. Calcined lead having lost this inflammable quality, is reduced to a red calx or mineral earth, which, if fluxed with any igneous body, such as oil, pitch, wax, fat, wood, bone, or mineral oil or bitumen, the fiery principle is resorbed, and the lead restored to its essential qualities; from these physical observations the reader may be convinced of those mineral waters as afford such a sediment being in a state of decomposition. They are thus deprived of one of the four elements or principles of which they are all more or less composed. Every analysis of mineral waters in their perfect state has demonstrated that they possess a fixed air, a volatile alkali, a volatile vitriolic acid, and the phlogiston. If, therefore

fore, either of these essential qualities is evaporated, or corrupted, the water being in a state of decomposition, must lose the virtues of a medicinal chalybeate.

It is only necessary to add a few further remarks, in order to shew in what particular complaints chalybeates, even in their most perfect state, are pernicious. By this means many of the diseased will be guarded against a fatal error: and as the prejudice in favour of such applications is so universally prevalent, it is hoped a few pages allotted to this subject will be deemed a most essential service to a deluded community. By removing such a pernicious partiality, the health, if not the lives of thousands, may be saved, to the great enjoyment of themselves and their relatives. Dr. Knight says very justly, "that the explanation of the manner of the operation of chalybeate medicines in human bodies is grounded upon false principles, and not matters of fact; to wit, that all chalybeate preparations, in a liquid form, owe their medicinal efficacy to the metal dissolved, whether in an aqueous or spirituous menstruum, retaining its metallic texture." To avoid entering into the whole detail of this interesting argument, it is only here stated in support of the above assertion, that as mineral waters are impregnated with a combination of sulphurs, salts, and earth, their virtues cannot be properly ascribed, as they have been, to the metals which they contain. It might be further proved, that iron cannot possibly enter the blood, retaining its essential qualities; for metals in general, except mercury, are suspended in liquids in *solutis, principiis*, or principles disengaged, which are thus deprived of their metallic properties. Iron, entering the body as a volatile vitriolic acid, cannot act by its specific gravity as mercury does; it therefore acts *per accidens*, and not *per se*. But admitting that waters, however impregnated with iron, are efficacious in checking all

diarrhoea and other profuse evacuations, by closing the relaxed vessels, and incrassating the fluids, yet as they prove sometimes so astringent as to stop the natural secretions, the consequences are frequently cramps, dangerous convulsions, which often end in fevers, inflammations, and mortifications, their indiscriminate use should be most cautiously avoided. Chalybeates, thus contracting the least pervious glands, should not be taken in acute inflammations, or in any complaints that are attended with a quick and strong pulse, a plethora, or extravasation of humours. They are equally dangerous in all nervous contractions, or where the blood is got into the arteriolæ, or capillary vessels. Thus, instead of acting like the sanative tea, which softens, smooths, and unbends the too constringed fibres, the vitriolic salts of this mineral water but more contracts the fibrillæ, by operating like so many wedges, which ultimately tear, rend, or divide the tender filaments. It must, however, be admitted that mineral waters are very beneficial in cachexies, scurvies, jaundice, hypochondriacal and hysterical affections. Having paid this tribute to their virtues, it is evident that what is above stated respecting their pernicious effects has been dictated by candour, and with no illiberal disposition to deny their absolute virtues *. These few remarks have only been made in order to warn the community against a prevailing and indiscriminate use which might otherwise, in many complaints, prove at least fatal to their health, if not to their existence. And as the tea discovered by Dr. Solander possesses all the virtues of the chalybeate, without its dangerous principles, it was an immediate duty not only to warn but to direct the Public in their adop-

* Waters drank at their source are efficacious in many complaints that are not accompanied with inflammatory symptoms; but if they are drank after a long or short conveyance, their effects must be proportionably injurious instead of beneficial.

adoption of an aliment so essential to their health, and consequently temporal happiness.

PREPARATION.

As the native and exotic herbs of this tea are dried in a pure air, without any artificial means of preparation to improve their colour or increase their natural astringency, they must be free from those deleterious, corrosive, and violent contractive effects with which we have observed the general and indiscriminate use of foreign teas and mineral waters are attended. In the first part of this Essay, it was stated that foreign teas were dried upon iron, and thus produced those astringent effects we have seen to characterise chalybeate waters. It is therefore evident, that the simple preparation of these salutary herbs being free from what renders teas and mineral waters in many cases pernicious, must leave their qualities pure and unadulterated, according to the intent and principle of nature in their production. They are, therefore, found particularly free from those injurious properties which render green tea so destructive to emaciated constitutions. Instead of being, like the above foreign tea, hurtful to those worn down by a long fever, or such as have weak and delicate stomachs, their qualities are in such complaints essentially nutritive and restorative. That stimulating roughness which foreign teas imbibe from their iron preparation, is not to be found in the sanative tea discovered by Dr. Solander; the latter is therefore very beneficial where the mucous coat of the bowels is very thin, or the ramification of the nerves numerous, extensive, and exquisitely sensible of impression. The cholic, gripes, or painful prickings of the nervous coat by the India teas are allayed by the drinking of the sanative tea, from its tepid and lubricating nature not being perverted by any corrosive preparation. To thin and incagre bodies, which are greatly affected by green and

and bohea teas, the above is a most restorative aliment. The atrophy and diabetes, so frequently caused by the foreign teas, are, from the herbs of Dr. Solander's tea possessing their natural nutritious qualities uncontaminated by metallic preparation, often cured by using it as a morning and evening beverage; and the depression of spirits occasioned by green and bohea, and which induces many of its drinkers to take sal volatile or spirits of hartshorn, is avoided by the fanative tea; for the latter is found one of the greatest and most salutary exhilarators of the nervous system. And thus those who drink it as a constant aliment, are saved from the dangers that attend rendering the blood too thin by the use of the above volatile alkalies or drams, which are too frequently taken to avoid that lowness of spirits caused by the great, sudden, and violent contraction of the nervous fibrillæ. As the inconveniences of the foreign teas arise from the metallic properties derived from their preparation, the advantages of the fanative tea are evidently seen to arise from the preparation being such as leaves every herb possessed of its natural and essential quality. This clearly evincing the superiority of Dr. Solander's tea to every other herbal beverage, it only remains to proceed to the two remaining inquiries respecting the mode of using, and the effects of this salutary combination of vegetables. The next subject, therefore, of investigation is the

MANNER OF USING.

As the time of drinking this tea is morning and evening, it is necessary to inquire whether its qualities are such as are calculated to suit the temporary necessities of nature at those periods. From what has been observed, respecting foreign teas, it is evident that their properties are diametrically opposite to those which nature at such times requires. When the body is exhausted by insensible perspiration, the most requisite aliment

aliment is that which can equally restore the loss of the solids, and the languid flow of the animal spirits. What is then taken ought therefore to be neither too heavy for the state of the unbraced system, nor too volatile to afford a sufficient quantity of nutritive juices to the whole animal economy. Nor should the aliment be so stimulating as to disorder instead of re-establishing the equalized motion of the yet perturbed state of the animal spirits. What is then given should have the power of sedating the nervous fluids, while it disseminates through the viscera the elements of nutrition. These being the requisite properties of what is taken as a breakfast, it remains to consider whether those of the sanative tea are adequate to such indispensable purposes.

In the preceding part of this inquiry, it has been found that the principal qualities of this tea are moderately astringent, balsamic, and aromatic ; it is therefore evident, that from a combination of these eminent medical principles, this tea must operate as a sedator of perturbation, a renovator of exhausted solids, and an exhilarator of nervous depression. They may therefore be used as a morning beverage with the greatest advantage, for the preservation and re-establishment of health ; for never were the qualities of any aliment so particularly adapted to the necessities of the body at any stated period, as those of the sanative tea are at the time of breakfast. Without loading the exhausted viscera, they afford it a sufficiency of balsamic and nutritive aliment ; nor does the sanative tea, by sedating the fluttering spirits, destroy their vigour ; but, on the contrary, by calming their motion, they contribute more active energy by promoting their equalized progress, and thus is the animal economy restored to the proper use and enjoyment of its functions. And in proportion as the spirits are restored to an equilibrium of motion and fluidity, the relaxed tone of the nerves is recovered, and the whole functions

tions of man rendered capable of exercise and enjoyment.

The above being stated as the advantages attending the use of the sanative tea in the morning, it is next expedient to consider what benefit is derived from the use of it in the afternoon.

At this time the body is in a very different state of temperature from that of the morning. By the toil, care, study, or amusement of the former part of the day, the solids are wasted, and the fluids in a state of ferment and evaporation. Added to this, the aliment which is taken at dinner time so exhausts the animal warmth, as to leave the whole body in a state of refrigeration. What is therefore taken in this situation, should be neither relaxing, constipating, nor heating; it should possess a genial warmth, a cordial assistant, and a restorative nutriment. The first should be such as to supply the deficiency of warmth which the body feels by the act of digestion, without inflaming the blood, or too greatly increasing the pulse. The second, or cordial assistant, should rather increase the powers of the body than those of the heart; for the force of the heart may be increased to the detriment of health. This is evident from a weakness of the body being the consequence of the force of the heart being increased in an inflammatory fever. And with regard to what is taken in the afternoon requiring a restorative nutriment, it is necessary that it should be light, pure, and wholesome, lest its solidity and heaviness should oppress the bowels at a time when their tone is relaxed by recent fatigue and digestion. These qualities being the most proper to produce fresh animal spirits, are the most fit to be taken when a new accession of them is necessary. It has been observed those are the most robust whose serum resembles most the white of an egg. It has therefore been most rationally concluded, that the origin of the animal spirits is from aliments capable of being changed into a simi-

lar substance, but so attenuated by incalation as concrete by fire. For this reason, the greatest support of the spirit is afforded by light and nourishing meats and drinks, which in taste and smell are even agreeable to infants. All cordials and aromatics are consequently the most proper for such purposes, and at such times when heavier foods would impress instead of recruiting the exhausted solids and fluids. It is therefore Boerhaave recommends such aromatics, for the reviving and recruiting the animal spirits, as have the most pleafant taste and smell. Agreeably to this opinion, Dr. Solander employed his researches to form an afternoon beverage of such herbs as should possess all the above cardiac and balsamic qualities. The use of the sanative tea between dinner and supper operates as the most reviving and wholesome aliment that can, at such a time, be possibly taken. An enquiry having been made into the nature, preparation, and manner of using the sanative tea, there only remains to conclude this Second Part of the Essay with the consideration of its

EFFECTS.

From the view that has been taken of the nature, preparation, and manner of using, the salutary effects are most clearly and easily to be ascertained. As the basis of this tea is the combined principle of the most balsamic oils, nutritious salts, and animating sulphurs, which the vegetable world produces, their effects must be proportionably salutary. And as their combination is such as to correct the pernicious qualities of each other, their conjoint effect must be the most wholesome that can possibly be administered for the health of human nature. As every simple, however specific in certain cases, possesses qualities that are pernicious in other respects, it has been the first principle of physical enquiry not only to find the basis of a medicine, but to form compounds or ingredients that corrected the

the injurious tendency of each other. With this scientific principle, Dr. Solander having composed his sanative tea, has rendered it the most general specific in its effects of any medicinal aliment.

This tea, affording a compound oil, which is formed of the most aromatic vegetables the earth affords, it is no wonder its effects, like honey, should approach so near a general specific. The invaluable oils, uniting with the sulphurs of the sanative tea, recruit, soften, and lubricate the juices, diminish the too great elasticity, dryness, and crispness of the nervous fibres, and afford the exhausted liquids fresh supplies. Their effects are consequently exceedingly restorative in all cases where the force of the fibres and the vessels are too strong, the circulation too rapid, and the blood too attenuated or diminished. As it prevents the too quick action of the solids, and the too rapid motion of the blood, the body is nourished, and the mind prepared for the refreshment of sleep when the approach of night invites to repose. In spitting of blood its effects are particularly beneficial. The oil being easily detached from the earth of the plants, is, in such cases exceedingly nutritive, and, by its checking the stimulation and sheathing the acrimony of the humours, the blood is replenished with the most healing and balsamic virtues.

In pleurisies, ulcers, and abscesses of the lungs; hectic fevers, dry coughs, night sweats, and difficulty of breathing, the balsamic oil and sulphur of this tea is most salutary.

The dropsical, phlegmatic, corpulent, cathectic, and all such as are, in their stamina, relaxed, will find the greatest relief in its constant use; and to those who are emaciated, either from hereditary or acquired disease it is particularly beneficial.

In seasons, when experience informs us that the blood requires cleansing and attenuating, this tea will be of considerable service to the healthy as well as the diseased.

seased. By this means, the constitution will be preserved and restored from all those chronic and acute afflictions which are the consequences of acrimonious humours and foulness of blood.

As this tea produces the effects of cleansing the stomach, promoting digestion, diluting the chyle, and invigorating the whole viscera; it should be constantly drank by those who live freely.

Unlike most medicinal applications, this tea requires no previous preparation of the body. Such are its nature and progression of effects, that it first renders the body in a state suitable to receive succeeding benefits; nor is it dangerous, like mineral waters, to which persons afflicted with nervous complaints generally resort. Persons suffering acute or inflammatory diseases, or who have their vessels too greatly constringed, need not be under the apprehensions of suffering schirrusses, or even death, which is the consequence of drinking, in such cases, mineral waters; but, on the contrary, they may expect to receive, from the use of the sanative tea, the most beneficial effects not only in the above, but also in the gout and rheumatism, from its moderate use producing a gentle perspiration.

To account for the variety of salutary effects that this valuable discovery produces, we shall now proceed to consider its operation as a medicine and an aliment, which will afford the most convincing and conclusive arguments that can be possibly adduced in favour of its sanative qualities.

To consider its medicinal properties or effects, it is necessary to state in what manner it acts first upon the solids, next upon the fluids, and lastly, how it operates upon both together; for on these three principles the power and quality of a medicine solely depend. In acting upon the solids, it either alters their texture and cohesion, or, by diluting the canals, change the figure of the sides. But a medicine acting upon fluids only, either alter their properties, or bring them out of the body.

body. All medicines however act as well upon the solids as the fluids; for the latter can scarcely be altered without, in some degree, affecting the former.

As all medicines derive the greatest qualities from their filling, evacuating, or altering the smallest parts, the sanative tea possesses the most restorative properties from its action upon the smallest nervous vessels, and not in the arteries, veins, glands, lymphatic, and adipose vessels. Thus, as all augmentation and accretion of the greater entirely depend on the extension of the smallest lateral vessels, which are nervous tubuli, the nutrition and restitution of what is wasted, must be considerably derived from the constant use of this beverage morning and evening. From this, the medicinal effects of the tea upon the solids are found to be consistent with the first of physical principles; for the nutrition of the solids, which is made by the application of any part to the place of a wasted part, is always effected in the smallest canals, of which the greater consist.

And as every salutary change of the fluids is made in the smallest vessels, the sanative tea possessing the power of conveying nutrition into the most minute channels of the body, the liquids must derive from it the greatest renovation.

From this combined effect upon the solids and liquids, the strength of the greater vessels is increased, and thus is the whole aggregate body invigorated; for every artery derives its energy from its sides, which are composed of the minutest vessels. To enter into a complete detail of its medicinal principles, would require a volume itself; we must therefore avoid any further inquiry of its effects as a physical remedy, in order to leave a few pages for its consideration as an aliment.

The qualities of an aliment chiefly depend in their nature affording that nourishment which is proper to the time of taking and the state of the body. Indeed, without

without their possessing these relative properties, either meats or drinks are injurious instead of beneficial. For this reason, physical necessity, more than tyrant custom, has caused a thinner aliment to be taken in the morning and evening, than what forms the meals of dinner and supper. This necessity arises from the state of the body being in the morning just recovering its spirits from a comparative state of relaxation and imbecility ; and in the afternoon from the stomach being enfeebled by recent digestion. That the body immediately after sleep is in a relaxed state, may be perceived by the perturbation the spirits experience from any surprise or violent action instantly succeeding. Fits and faintings have frequently been the consequence of persons of quick sensibilities being suddenly wakened. In such a state of relative debility, gross and solid food must oppress the spirits, and thus render the body incapable of deriving nourishment from such an untimely aliment. But if what is taken is light, pure, and apt for producing chyle, the stomach being capable of digesting it, must turn it to the most wholesome nutrition. To attain this end, foreign teas, from their lightness, have been universally adopted ; but as we have found from their nature, how ill adapted they are to be given when the nerves are already too weak to bear their violent astringency, such should be used as are possessed of the most nutrition, without a tendency to irritate the relaxed fibrillæ.

When the stomach is enfeebled by recent digestion in the afternoon, to take then another meal of solid aliment must evidently tend to depress the digestive powers, and thus prevent the body from having that nourishment it might receive from a lighter aliment.

The sanative tea being found, from the preceding inquiries, to possess the most active, subtle, penetrating, and balsamic compound oils, salts, and sulphurs, which pervade, without irritation, the minutest canals, must

must afford that species of aliment which the body in a morning and afternoon requires. While it attenuates, it restores the tone and substance of the juices, strengthens the solids, invigorates every natural function, and thus affords the means of enjoying all the comfort that a healthy body and a happy mind can bestow.



Donald ,

Donald .

THE END.

